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(FILE 'HOME' ENTERED AT 16:30:25 ON 12 FEB 2002)

FILE 'CAPLUS' ENTERED AT 16:30:39 ON 12 FEB 2002

L1 50 S ELECTRODE AND MONOLAYER AND OLIGOMER?  
L2 7 S L1 AND PATENT/DT  
L3 43 S L1 NOT L2

=> d bib,abs 13-43

L3 ANSWER 13 OF 43 CAPLUS COPYRIGHT 2002 ACS

AN 1999:70554 CAPLUS

DN 130:129879

TI Protein adsorption on self-assembled **monolayers** with water-soluble non-ionic **oligomers** using quartz-crystal microbalance

AU Saito, Noboru; Matsuda, Takehisa

CS Department Bioengineering, Research Institute, National Cardiovascular Center, Suita, 565, Japan

SO Mater. Sci. Eng., C (1998), C6(4), 261-266

CODEN: MSCEEE; ISSN: 0928-4931

PE Elsevier Science S.A.

DT Journal

LA English

AB This study was conducted to det. protein adsorption characteristics on water-sol. non-ionic **oligomers**. **Oligomers** of ethylene glycol (Oligo-EG), acrylamide (Oligo-AM), and N,N-dimethylacrylamide (Oligo-DMA) were coupled to 12-mercaptododecanoic acid. Self-assembled **monolayers** (SAMs) of these alkanethiols were formed on gold **electrodes** of quartz-crystal microbalance (QCM). The protein adsorption on SAMs, detd. using QCM technique, was decreased in order: Oligo-EG < Oligo-AM < Oligo-DMA.

RE.CNT 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L3 ANSWER 14 OF 43 CAPLUS COPYRIGHT 2002 ACS

AN 1998:788194 CAPLUS

DN 130:216261

TI Electrochromic devices based on surface-modified nanocrystalline TiO2 thin-film **electrodes**

AU Campus, F.; Bonhote, P.; Gratzel, M.; Heinen, S.; Walder, L.

CS Ecole Polytechnique Federale, Institut de Chimie Physique, Lausanne, CH-1015, Switz.

SO Sol. Energy Mater. Sol. Cells (1999), 56(3-4), 281-297

CODEN: SEMCEQ; ISSN: 0927-0248

PB Elsevier Science B.V.

DT Journal; General Review

LA English

AB A review with 16 refs. is given. Nanocryst. TiO2 thin film **electrodes** on conductive glass were modified with **monolayers** of different electrochromic compds. (mono-, di- and trimeric N,N'-dialkyl- or-diphenyl-4,4'-bipyridinium salts) equipped with TiO2 anchoring groups (An=benzoate, salicylate, phosphonate). The synthesis of these compds. is reported. Different approaches have been studied to increase the surface concn. .GAMMA.CS of electrochem. active coloring centers (CS) on TiO2. The **electrodes** were checked coulometrically and spectroelectrochem. under potentiostatic conditions in MeCN/TEAP. .GAMMA.CS Of mono- and **oligomeric** viologens was shown to depend on the ratio (CS/An) of CS to anchoring groups (An). A cone-shaped trimeric arborol-type viologen was prepd. with the intention to fill out the space above the convex surface of the nanoparticles

particularly well. Preliminary results of a new type of TiO<sub>2</sub> solid-phase supported synthesis of the viologens is reported. Electrochromic devices including filters and displays have been prepd. The filter devices (12-100 cm<sup>2</sup>) consist generally of OTE/TiO<sub>2</sub>-poly-viologen/glutaronitrile-LiN(SO<sub>2</sub>CF<sub>3</sub>)<sub>2</sub>+spacer/Prussian Blue/OTE and exhibit optical d. changes up to 2 (transparent to blue or yellowish to green and red-brown (at higher potential)) at switching times in the range of 1-3 s. Even higher optical d. changes (at slower switching times) were achieved with systems such as OTE/TiO<sub>2</sub>-poly-viologen/glutaronitrile-LiN(SO<sub>2</sub>CF<sub>3</sub>)<sub>2</sub>+spacer/Prussian Blue-TiO<sub>2</sub>/OTE. The display devices prepd. include reflective displays with two to four sep. addressable segments ((OTE/TiO<sub>2</sub>) (both structured)-oligo-viologen/microcryst. rutile (reflective layer)/molten salt+spacer/Zn) or (OTE/TiO<sub>2</sub> (both structured)-oligo-viologen/microcryst. rutile (reflective layer)/glutaronitrile-LiN(SO<sub>2</sub>CF<sub>3</sub>)<sub>2</sub>+spacer/Prussian Blue/OTE), as well as transparent systems with up to four addressable segments such as: OTE/TiO<sub>2</sub> (both structured)-poly-viologen/glutaronitrile-LiN(SO<sub>2</sub>CF<sub>3</sub>)<sub>2</sub>+spacer/Prussian Blue/OTE.

RE.CNT 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L3 ANSWER 15 OF 43 CAPLUS COPYRIGHT 2002 ACS  
AN 1998:712035 CAPLUS  
DN 130:96455  
TI Molecular scale electronics: syntheses and testing  
AU Reinherth, William A.; Jones, LeRoy, II; Burgin, Timothy P.; Zhou, Chong-wu; Muller, C. J.; Deshpande, M. R.; Reed, Mark A.; Tour, James M.  
CS Department of Chemistry and Biochemistry, University of South Carolina, Columbia, SC, 29208, USA  
SO Nanotechnology (1998), 9(3), 246-250  
CODEN: NNOTER; ISSN: 0957-4484  
PB Institute of Physics Publishing  
DT Journal  
LA English  
AB This paper describes four significant breakthroughs in the syntheses and testing of mol. scale electronic devices. The 16-mer of oligo(2-dodecylphenylene ethynylene) was prepd. on Merrifields resin using the iterative divergent/convergent approach which significantly streamlines the prepn. of this mol. scale wire. The formation of self-assembled **monolayers** and multilayers on gold surfaces of rigid rod conjugated **oligomers** that have thiol, .alpha., .omega.-dithiol, thioacetyl, or .alpha., .omega.-dithioacetyl end groups have been studied. The direct observation of charge transport through mols. of benzene-1, 4-dithiol, which have been self-assembled onto two facing gold **electrodes**, has been achieved. Finally, we report initial studies into what effect varying the mol. alligator clip has on the mol. scale wire's cond.

RE.CNT 45 THERE ARE 45 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L3 ANSWER 16 OF 43 CAPLUS COPYRIGHT 2002 ACS  
AN 1998:528789 CAPLUS  
TI A highly sensitive DNA biosensor based on redox-active DNA probes and molecular wires.  
AU Bamdad, C.; Fraser, S. E.; Meade, T. J.; O'Connor, S.; Yu, C. J.; Kayyam, J. F.  
CS USA  
SO Book of Abstracts, 216th ACS National Meeting, Boston, August 23-27 (1998), I&EC-080 Publisher: American Chemical Society, Washington, D. C. CODEN: 66KYA2  
DT Conference; Meeting Abstract  
LA English  
AB We have developed technologies for the direct electronic detection of DNA.

These technologies are based on the detection of redox-active metal complexes covalently attached to DNA probes. Detection of DNA targets is based on hybridization of the targets to metal-labeled probes and to DNA probes immobilized on electrode arrays (DNA chips). Hybridization to the probe electrode results in generation of a highly sensitive redox signal upon application of a bias potential. Self-assembled monolayer technol. is used to insulate the gold electrodes from unbound redox species. Signal transduction from the DNA is facilitated through the use of DNA probes attached to "mol. wires" based on Ph acetylene oligomers. These two technologies allow the micro-electrodes to achieve low detection limits in a homogeneous assay format, even in whole blood. Based on this assay system, we have developed a hand-held detector of DNA Hybridization and are developing DNA probe assays for numerous clin. and environmental applications. These assays will combine the power of DNA chips with the convenience and low cost of simple homogeneous assays.

L3 ANSWER 17 OF 43 CAPLUS COPYRIGHT 2002 ACS

AN 1998:465565 CAPLUS

DN 129:237984

TI Recent advances in molecular scale electronics

AU Tour, James M.; Reinert, William A.; Jones, Leroy, II; Burgin, Timothy P.; Zhou, Chong-Wu; Muller, C. J.; Deshpande, M. R.; Reed, Mark A.

CS Department of Chemistry and Biochemistry, University of South Carolina, Columbia, SC, 29208, USA

SO Ann. N. Y. Acad. Sci. (1998), 852 (Molecular Electronics: Science and Technology), 197-204

CODEN: ANYAA9; ISSN: 0077-8923

PB New York Academy of Sciences

DT Journal; General Review

LA English

AB A review with 41 refs. This paper describes four significant breakthroughs in the synthesis and testing of mol. scale electronic devices. The 16-mer of oligo(2-dodecylphenylene ethynylene) was prepd. on Merrifield's resin using the iterative divergent/convergent approach which significantly streamlines the prepn. of this mol. scale wire. The formation of self-assembled monolayers (SAMs) and multilayers on Au surfaces of rigid rod conjugated oligomers that have thiol, .alpha.,.omega.-dithiol, thioacetyl, or .alpha.,.omega.-dithioacetyl end groups were studied. The direct observation of charge transport through mols. of benzene-1,4-dithiol, which were self-assembled onto two facing Au electrodes, was achieved. Finally, the authors are reporting initial studies into what effect varying the mol. alligator clip has on the mol. scale wire's cond.

L3 ANSWER 18 OF 43 CAPLUS COPYRIGHT 2002 ACS

AN 1998:440188 CAPLUS

DN 129:181328

TI New oligothienyl-phenanthroline ligands: precursors for polymers consisting of conjugated links entwined around transition metal

AU Bidan, G.; Billon, M.; Divisia-Blohorn, B.; Leroy, B.; Vidal, P. L.; Kern, J. M.; Sauvage, J. P.

CS Departement de Recherche Fondamentale sur la Matiere Condensee, UMR 585 du CEA-CNRS, Universite J. Fourier, SI3M-LEM, CEA Grenoble, Grenoble, 38054, Fr.

SO J. Chim. Phys. Phys.-Chim. Biol. (1998), 95(6), 1254-1257

CODEN: JCPBAN; ISSN: 0021-7689

PB EDP Sciences

DT Journal

LA English

AB A new class of complexes of entwined ligands, Cu(T1)2+ and Cu(T2)2+, were synthesized, resp., from the 2,9-bis(2-thienyl)-1,10-phenanthroline (T1)

and the 2,9-bis(2-bithienyl)-1,10-phenanthroline (T2). Their spectroscopic and electrochem. properties were studied. Electropolymer. of these ligands and complexes on platinum **electrode** is depicted. Cu(T1)2+ leads to a **monolayer** which does not contain a metallic center. However, the film obtained from Cu(T2)2+ shows an electroactivity of both the metallic center and the polymer matrix.

L3 ANSWER 19 OF 43 CAPLUS COPYRIGHT 2002 ACS

AN 1998:260017 CAPLUS

DN 128:295407

TI Synthesis and grafting properties of functionalized oligo(para-phenylene)s  
AU Si-Ahmed, Lynda; Nueesch, Frank; Zuppiroli, Libero; Francois, Bernard  
CS Laboratoire Physique Solides Semi-Cristallins, Departement Physique, Ecole Polytechnique Federale, Lausanne, CH-1015, Switz.

SO Macromol. Chem. Phys. (1998), 199(4), 625-632

CODEN: MCHPES; ISSN: 1022-1352

PB Huethig & Wepf Verlag

DT Journal

LA English

AB For the purpose of grafting conjugated mols. on metal or oxide **electrodes** (which is an essential step towards a new generation of reliable org. light emitting diodes), the authors have synthesized sol. oligocyclohexadienes (12 cyclic units) by anionic polymer. and functionalized them by carboxylic acids, thiol, and siloxane. Aromatization of the **oligomer** to oligo(p-phenylene) (OPP) is carried out by dehydrogenation with chloranil. The adsorption of the carboxylic OPP derivs. on indium tin oxide powder is investigated by soln. equilibration. In THF an equil. const. of  $K = 21,500 \text{ L mol}^{-1}$  and a max. surface coverage ( $N_{\text{max}}$ ) of  $4 \mu\text{mol/m}^2$  are obtained by using the Langmuir equation. A characteristic area of  $40 \text{ \AA}^2$  per mol. is inferred from the surface d. of adsorbed OPP, which indicates that a densely packed **monolayer** of vertically adsorbed mols. is formed.

L3 ANSWER 20 OF 43 CAPLUS COPYRIGHT 2002 ACS

AN 1998:176598 CAPLUS

DN 128:210034

TI Electrochemical post self-assembly transformation of 4-aminothiophenol **monolayers** on gold **electrodes**

AU Lukkari, Jukka; Kleemola, Kari; Meretoja, Minna; Ollongqvist, Tapio; Kankare, Jouko

CS Department of Chemistry, University of Turku, Turku, FIN-20014, Finland

SO Langmuir (1998), 14(7), 1705-1715

CODEN: LANGD5; ISSN: 0743-7463

PB American Chemical Society

DT Journal

LA English

AB Electrochem. oxidn. of a self-assembled **monolayer** (SAM) of 4-aminothiophenol on polycryst. gold **electrodes** leads to a complex voltammetric behavior characterized by an initial irreversible oxidn. at approx. +0.77 V vs. SSCE (sodium SCE) and the formation of a pseudostable surface redox couple at +0.53 V. The oxidized form of this couple is hydrolyzed in acidic solns. to another redox pair with the formal redox potential of approx. +0.3 V. We show that the oxidn. leads to a radical-radical coupling reaction between two adjacent aminothiophenol mols., yielding an **electrode** surface modified with 4'-mercapto-4-aminodiphenylamine, the thiol deriv. of a head-to-tail aniline dimer. The oxidized form of the dimer, quinone diimine, undergoes hydrolysis to the corresponding quinone monoimine and, eventually, to the original surface-bound 4-aminothiophenol and benzoquinone. The mechanism of the **monolayer** oxidn. reaction has been elucidated by a variety of electrochem. and spectroelectrochem. techniques together with electrochem. data obtained with a sol. model compd., 4-

(methylthio)aniline. In addn., XPS characterization of the 4-aminothiophenol (Au-SPhNH<sub>2</sub>), the 2-(4'-mercaptophenylamino)benzoquinone (Au-SPhNH-BQ), and the oxidized 4-aminothiophenol SAMs is reported. The formation of an **electrode** surface modified with aniline dimers explains the beneficial effect that 4-aminothiophenol SAM exhibits in the electrochem. polymn. of aniline. We suggest that it favors the direct addn. of aniline monomers to the **oligomer** chains on the surface, which results in a more ordered structure compared with the deposition of **oligomers** from the soln. This increased order is very important for the prepn. of highly ordered polyaniline films for advanced applications in mol. electronics and sensor technol. The results also show that after the initial dimerization step, aniline polymn. can proceed through coupling of the neutral monomer to the oxidized **oligomer**

L3 ANSWER 21 OF 43 CAPLUS COPYRIGHT 2002 ACS  
 AN 1998:52026 CAPLUS  
 DN 128:106778  
 TI Surface-Confined Monomers on **Electrode** Surfaces. 4.  
 Electrochemical and Spectroscopic Characterization of Undec-10-ene-1-thiol Self-Assembled **Monolayers** on Au  
 AU Peanasky, John S.; McCarley, Robin L.  
 CS Choppin Laboratories of Chemistry, Louisiana State University, Baton Rouge, LA, 70803-1804, USA  
 SO Langmuir (1998), 14(1), 113-123  
 CODEN: LANGD5; ISSN: 0743-7463  
 PB American Chemical Society  
 DT Journal  
 LA English  
 AB The synthesis, structure, and reactivity of undec-10-ene-1-thiol **monolayers** assembled on planar and nanocryst. (curved) Au is presented. Cyclic voltammetry and IR spectroscopy are used to probe the structural changes in the **monolayers** (on planar Au) upon irradiation with .gamma.-rays. **Oligomerization** of the **monolayers** during the .gamma.-ray exposures is indicated by the obsd. decrease in the intensities of IR bands assocd. with the olefin functionality. From IR spectra obtained during .gamma.-ray exposures of the undec-10-ene-1-thiol **monolayers** on planar Au, it is proposed that the **oligomerization** reaction is controlled by the distance the tethered olefin groups can move. That is to say the reaction is stress limited. Dropcast films of undec-10-ene-1-thiol/Au nanoclusters (1.3 and 3.4 nm diam. Au crystals) do not exhibit decreases in the olefin IR bands after large .gamma.-ray exposures. This decrease in reactivity for the olefin **monolayers** supported on the Au nanocrystals is suggested to be the result of interdigitation of the alkane chains from neighboring alkanethiolate Au clusters that exist in the dropcast films.

L3 ANSWER 22 OF 43 CAPLUS COPYRIGHT 2002 ACS  
 AN 1997:430006 CAPLUS  
 DN 127:136316  
 TI Polyaminoquinone self-assembled films on **electrodes**: synthesis of all-organic molecular wires by solution phase epitaxy  
 AU Lukkari, Jukka; Kleemola, Kari; Meretoja, Minna; Kankare, Jouko  
 CS Dep. Chem., Univ. Turku, Turku, FIN-20014, Finland  
 SO Chem. Commun. (Cambridge) (1997), (12), 1099-1100  
 CODEN: CHCOFS; ISSN: 1359-7345  
 PB Royal Society of Chemistry  
 DT Journal  
 LA English  
 AB Redox active mol. wires consisting of successive benzoquinone and diamino moieties were formed on a gold surface using repetitive self-assembly and soln. epitaxy and monitored by cyclic voltammetry. The gold

electrode was primed with a monolayer of p-mercaptoaniline [SPhNH], which is non-electroactive in the voltage range of interest. The charge due to diaminoquinone units increases upon amine addn. but stays more or less const. during addn. of quinone to the chain, indicative of sequential formation of polyaminoquinone [Q-A] chains on the electrode surface. The Au-SPhNH-(Q-A)<sub>5</sub>-Q electrode retains about 70% of total electroactivity after 40 days when stored in water under ambient atm.

L3 ANSWER 23 OF 43 CAPLUS COPYRIGHT 2002 ACS  
AN 1997:335075 CAPLUS  
DN 127:4808  
TI Through-Bond Orbital Coupling, the Parity Rule, and the Design of "Superbridges" Which Exhibit Greatly Enhanced Electronic Coupling: A Natural Bond Orbital Analysis  
AU Paddon-Row, Michael N.; Shephard, Michael J.  
CS School of Chemistry, University of New South Wales, Sydney, 2052, Australia  
SO J. Am. Chem. Soc. (1997), 119(23), 5355-5365  
CODEN: JACSAT; ISSN: 0002-7863  
PB American Chemical Society  
DT Journal  
LA English  
GI

\* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT \*

AB An ab initio MO study of through-bond (TB) orbital interactions has been carried out on several series of diene hydrocarbons, e.g., I ( $n = 2m + 2$ ), in which the double bonds are covalently attached to a variety of rigid satd. hydrocarbon bridges with lengths,  $n$ , ranging from four to 17 C-C  $\sigma$  bonds. The resulting TB  $\pi^+$ ,  $\pi^-$  and  $\pi^+$ ,  $\pi^-$  splitting energies,  $\Delta E(\pi)$  and  $\Delta E(\pi^*)$ , resp., were obtained at the HF/3-21G level of theory. The distance dependence of  $\Delta E(\pi)$  and  $\Delta E(\pi^*)$  for each type of diene was fitted to the resp. exponential decay profiles,  $\Delta E(\pi) = A \exp(-\beta_h n)$  and  $\Delta E(\pi^*) = B \exp(-\beta_e n)$ . It was found that both  $\beta_h$  and  $\beta_e$  were dependent on the nature of the hydrocarbon bridge. For example,  $\beta_h$  is found to range from 0.6 per bond for II ( $n = 4m + 2$ ) to only 0.05 per bond for III ( $n = 4m + 2$ ) and IV ( $n = 4m + 3$ ). The  $\beta_h$  values for the polynorbornane bridge dienes, I( $n$ ), and the hybrid norbornane-bicyclo[2.2.0]hexane bridge dienes, II( $n$ ), are notably larger than that for the divinylalkanes, V ( $n = 2m + 2$ ), and Natural Bond Orbital (NBO) analyses revealed this to be due to destructive interference effects between the two main relays of the bridges in I( $n$ ) and II( $n$ ). A simple intuitive model, based on the parity rule of TB coupling, was developed to explore interrelay interference effects in TB coupling along various satd. hydrocarbon bridges. The parity rule model was successfully used to design systems e.g., VI ( $n = 2m + 2$ ), in which the TB coupling between the two double bonds is greatly enhanced by constructive interrelay interference. For example, the abs. value for  $\Delta E(\pi)$  for the 15-bond diene IV ( $n = 15$ ) is 0.21 eV, an extraordinarily large quantity, considering that the double bonds are 17  $\text{\AA}$  apart, and  $\beta_h$  for the series IV( $n$ ) is only 0.05 per bond. TB coupling in the "superbridges" III( $n$ ), IV( $n$ ), VII ( $n = 4m + 2$ ), VIII ( $n = 4m + 3$ ), IX ( $n = 4m + 6$ ), and 16 ( $n = 4m + 7$ ) can be up to two orders of magnitude stronger than that present in I( $n$ ) and II( $n$ ). The enhanced degree of TB coupling in the former systems translates into a predicted increase in the rate of hole transfer in the cation radicals of III ( $n = 14$ ) and IV ( $n = 15$ ) of four orders of magnitude, compared to that for the

cation radical of II( $n = 14$ ). NBO analyses of TB coupling in VI( $n$ ) and XI( $n = 2m + 4$ ) revealed that strong interrelay interference may occur even when one of the relays is not electronically coupled to either double bond. It was found that the original version of the parity rule required modification so that it takes into account any change in parity of a coupling pathway caused by sign inversions between coupling orbitals. A relative parity rule of TB coupling is proposed which correctly addresses the topol. of orbital overlap. Compared to  $\pi$ -TB coupling, TB interactions involving  $\pi^*$  orbitals are less affected by interrelay interference, constructive or destructive.

L3 ANSWER 24 OF 43 CAPLUS COPYRIGHT 2002 ACS

AN 1997:289719 CAPLUS

DN 127:72088

TI Aggregation phenomena occurring on an **electrode** surface in the presence or absence of aggregation in the bulk electrolyte solution

AU Nikitas, P.

CS Laboratory of Physical Chemistry, Department of Chemistry, Aristotle University of Thessaloniki, 54006, Thessaloniki, Greece

SO J. Electroanal. Chem. (1997), 425(1-2), 97-106

CODEN: JECHES; ISSN: 0368-1874

PB Elsevier

DT Journal

LA English

AB One single-step and two multi-step models for aggregation processes occurring on an **electrode** surface in the presence or absence of aggregation phenomena in the bulk soln. were used to study the properties of an adsorbed **monolayer** when the adsorbate mols. are able to form aggregates. Despite the fact that the three models predict considerable different size distributions of the intermediate aggregates, they give almost the same picture about the compn. of an adsorbed **monolayer** and its capacitance characteristics. According to these models, the only indication of the occurrence of a surface aggregation process in the capacitance plots is the appearance of asym. peaks with one vertical side. Bulk aggregates do not affect the shape of the capacitance curves. If they are large, they stabilize the compn. of the adsorbed layer and the shape of the capacitance curves remains unchanged with the increase in the surfactant concn. If they are small, i.e. **oligomers**, their effect is to reduce the adsorbate concn. in the bulk soln. Finally, the discrepancies between theory and expt. are indicated and the possibility that adsorbed bulk aggregates disintegrate very slowly on the **electrode** surface is discussed. Capacitance adsorbed **monolayer** aggregation phenomena. **Monolayer** adsorbed property **electrode** aggregation phenomena.

L3 ANSWER 25 OF 43 CAPLUS COPYRIGHT 2002 ACS

AN 1997:224861 CAPLUS

DN 126:322758

TI Using self-assembled **monolayers** to modify **electrode** interfaces in organic light-emitting diodes

AU Chan, Weidong; Burnham, Sandra; Chidsey, Christopher E. D.; Scott, J. Campbell

CS IBM Res. Div., IBM Almaden Res. Cent., San Jose, CA, 95120-6099, USA

SO Polym. Prepr. (Am. Chem. Soc., Div. Polym. Chem.) (1997), 38(1), 936

CODEN: ACPPAY; ISSN: 0032-3934

PB American Chemical Society, Division of Polymer Chemistry

DT Journal

LA English

AB Gold anodes were deposited onto a glass substrate, and self assembled **monolayers** (SAMs) were deposited by immersion into a p-xylene soln. The luminescent polymer layer was poly(2-methoxy-5(2'-ethylhexyloxy-p-phenylene)vinylene), MEH-PPV, and the cathode was calcium. Radiance as

a function of voltage is presented using several SAMs, including a ferrocene terminated alkane thiol and a phenylene ethynylene oligomer.

L3 ANSWER 26 OF 43 CAPLUS COPYRIGHT 2002 ACS

AN 1997:195483 CAPLUS

DN 126:183452

TI Correlation of the Structural Decomposition and Performance of Pyridinethiolate Surface Modifiers at Gold **Electrodes** for the Facilitation of Cytochrome c Heterogeneous Electron-Transfer Reactions

AU Lamp, Brian D.; Hobara, Daisuke; Porter, Marc D.; Niki, Katsumi; Cotton, Therese M.

CS Ames Laboratory-USDOE Department of Chemistry and Microanalytical Instrumentation Center, Iowa State University, Ames, IA, 50011, USA

SO Langmuir (1997), 13(4), 736-741

CODEN: LANGD5; ISSN: 0743-7463

PB American Chemical Society

DT Journal

LA English

AB This paper describes the results of an electrochem. and spectroscopic (IR reflection and X-ray photoelectron spectroscopies) investigation of the modified gold **electrode** surfaces prep'd. from dil. ethanolic solns. of 4-mercaptopyridine (PySH) and 4,4'-dipyridyl disulfide (PySS). Both precursors have been used extensively as facilitators for the electron transfer of redox proteins like cytochrome c (cyt c). During the course of an investigation of the interfacial architectures formed from the two different precursors, a previously unreported structural instability in the adlayers was discovered. This instability manifests itself as a decrease in the ability of the modified surfaces to facilitate the electron transfer of cyt c that correlates with an increase of the immersion time in the precursor solns. Results are presented that delineate the decrease in facilitator performance and probe the structural changes resulting in the decrease in performance. Together, the electrochem. and surface spectroscopic findings reveal that the modified surfaces spontaneously decomp. to yield an adlayer composed largely of adsorbed at. and **oligomeric** sulfur, an adlayer that we found to be ineffective in the facilitation of the electron transfer reaction of cyt c. The implications of these findings on the use of this type of modifier to studies of electron transfer reactions of redox proteins and to issues of the general structural stability of organosulfur-based **monolayers** are briefly discussed.

L3 ANSWER 27 OF 43 CAPLUS COPYRIGHT 2002 ACS

AN 1997:185439 CAPLUS

DN 126:335802

TI Gold **electrodes** with polyion multilayers and electrostatically bound redox couples

AU Lowy, D. A.; Finklea, H. O.

CS Dep. Chem., West Virginia Univ., Morgantown, WV, 26506-6045, USA

SO Electrochim. Acta (1997), 42(9), 1325-1335

CODEN: ELCAAV; ISSN: 0013-4686

PB Elsevier

DT Journal

LA English

AB Self-assembled **monolayers** of alkane thiols with terminal ionized moieties readily adsorb polyions of the opposite charge to form a bilayer structure. A 2nd polyion layer can be adsorbed electrostatically onto the 1st polyion layer to yield a trilayer. Ellipsometry suggests that the polyion layers have thicknesses comparable to that of the self-assembled **monolayer**. Each polyion layer can also electrostatically bind a redox couple, although only certain combinations of polyion and redox couple yield a stable redox wave. The reaction of ferroin and other iron



complexes onto an anionic surface (**monolayer** or trilayer) leads to a pH-sensitive surface redox couple believed to be an **oligomer** of iron hydroxide. A two-terminal pH sensor described by I. Rubinstein (1984), and J. J. Hickman et al. (1991, 1992) is demonstrated using electrostatically bound redox couples.

L3 ANSWER 28 OF 43 CAPLUS COPYRIGHT 2002 ACS

AN 1997:178369 CAPLUS

DN 126:284954

TI Derivatized **electrodes** in the construction of organic light emitting diodes

AU Nueesch, Frank; Si-Ahmed, Lynda; Francois, Bernard; Zuppiroli, Libero  
CS Departement Physique, Ecole Polytechnique Federale, Lausanne, CH-1015, Switz.

SO Adv. Mater. (Weinheim, Ger.) (1997), 9(3), 222-225

CODEN: ADVMEW; ISSN: 0935-9648

PB VCH

DT Journal

LA English

AB A decrease of the operating turn-on field as well as a significant increase in the durability of org. LEDs can be achieved by chem. attaching the electroactive polymer to the metal-oxide **electrode**. A blue light-emitting device based on poly(para-phenylene) (PPP) was chosen to demonstrate the advantages of the grafting process. The sol. PPP sequence used in the LED consisted of .apprxeq.12 phenylene units. An .alpha.-carboxylated oligophenylene (PPP-func), synthesized by the reaction of the carbanion in chain end position with succinic anhydride, was prepd. for grafting the **oligomer** on the metal oxide **electrode**. A binding const. of  $K = 22,000 \text{ L/mol}$  was measured by exposure of a known ITO surface area to PPP-func solns. of different concns. The max. surface coverage achieved was .apprxeq.4 .mu.mol/m<sup>2</sup> (surface area of 40 .ANG.2 per mol.). The derivatized anodes produced by this method are subsequently used to form either single-layer or bilayer diodes terminated by an Al cathode. Diodes with a conventional nonderivatized ITO **electrode** were fabricated for comparison. Using a derivatized ITO-**electrode** a decrease in turn-on field was obsd., light emission occurred at a lower field of 100 MV/cm and followed the current field characteristic. The long term stability is improved by a factor of 10 under continuous d.c. operation. This is interpreted in terms of an elec. field effect induced by the acid functional group of the grafted mols. A formalism for detg. the change in the barrier potential (.DELTA..PHI.) between derivatized and nonderivatized **electrodes** was developed and a value of 0.6 V was calcd. for .DELTA..PHI.. The emitter tris-(8-hydroxyquinoline)-Al (Alq) was also used to test the derivatized metal oxide anode. In the presence of a grafted PPP-func **monolayer** at the ITO **electrode**, green light emission was obsd. at a lower turn-on field than that for electron injection. The derivatized **electrode** was also tested in bilayer devices consisting of non-functionalized PPP and Alq. Again the turn-on elec. field was lower.

L3 ANSWER 29 OF 43 CAPLUS COPYRIGHT 2002 ACS

AN 1997:164371 CAPLUS

TI Using self-assembled **monolayers** to modify **electrode** interfaces in polymeric light-emitting diodes.

AU Chen, Weidong; Burnham, Sandra; Chidsey, Christopher E. D.; Scott, J. Campbell

CS IBM Research Division, IBM Almaden Research Center, San Jose, CA, 95120-6099, USA

SO Book of Abstracts, 213th ACS National Meeting, San Francisco, April 13-17 (1997), POLY-446 Publisher: American Chemical Society, Washington, D. C. CODEN: 64AOAA

DT Conference; Meeting Abstract

LA English

AB Charge injection from the **electrodes** of polymer light-emitting diodes into the emissive layer plays a crit. role in the overall efficiency of such devices. In order to understand in more detail the mechanism of the injection process and to provide guidance for optimizing the charge injection rate, we have studied chem. well controlled and well characterized **electrodes**, consisting of self-assembled **monolayers** (SAMs) at the interface between gold anodes and thin films of MEH-PPV. The SAMs are prepd. from alkane-thiols of length up to C12, which are used to tether various electro-active species, such as ferrocene or phenyleneethynylene **oligomers**, at a well-defined distance from the gold surface. Current-voltage and radiance measurement are employed to det. the effect on charge injection properties. The efficiency of charge transfer is found to depend on the length of the alkane spacer and on the oxidn. potential of the active group.

L3 ANSWER 30 OF 43 CAPLUS COPYRIGHT 2002 ACS

AN 1996:713367 CAPLUS

DN 126:12431

TI Electrochemical redox reactions of hemin derivatives having thienylene groups in ion conductive PEO **oligomers**

AU Ohtaki, Hiroyuki; Kawahara, Natsue Y.; Ohno, Hiroyuki

CS Dep. Biotechnol., Tokyo Univ. Agric. Technol., Tokyo, 184, Japan

SO Solid State Ionics (1996), 86-88(Pt. 1), 333-336

CODEN: SSIOD3; ISSN: 0167-2738

PB Elsevier

DT Journal

LA English

AB A hemin deriv. from the reaction with 3-hydroxyethyl thiophene to obtain a hemin thienyl ester (HTE), was synthesized and its electrochem. behavior was studied in poly(ethylene oxide) (PEO) **oligomer** electrolytes. A cyclic voltammogram of HTE dissolved in DMF/n-tetrabutylammonium perchlorate showed redox peaks ( $E_{1/2} = -0.10$  V vs. Ag) based on the heme (iron protoporphyrin IX). The HTE showed the same redox behavior in the electrolyte of PEO200 (molar mass of 200) contg. KCl. Sym. redox waves were obsd. in the cyclic voltammogram of HTE adsorbed on ITO coated glass **electrode** in PEO200 / KCl. The peak sepn. was about 10 mV and the current passed through was const. and both were independent of the scan rate. These results indicate that HTE mols. were fixed on the ITO **electrode** as a **monolayer**. The thienylene group was effective for fixing the redox active mols. on the ITO **electrode** in a way suitable for electron transfer even in PEO electrolytes. These **electrode** can be used as promoters in protein electrochem.

L3 ANSWER 31 OF 43 CAPLUS COPYRIGHT 2002 ACS

AN 1996:688539 CAPLUS

DN 126:110147

TI Electron-transfer kinetics of ferrocene alkanethiolate **monolayers** in ether and polyether solvents

AU Ingram, Roychelle S.; Murray, Royce W.

CS Kenan Labs. Chem., Unic. North Carolina, Chapel Hill, NC, 27599-3290, USA

SO J. Chem. Soc., Faraday Trans. (1996), 92(20), 3941-3946

CODEN: JCFTEV; ISSN: 0956-5000

PB Royal Society of Chemistry

DT Journal

LA English

AB The electron-transfer kinetics of self-assembled mixed **monolayers** of 16-(ferrocenylcarbonyloxyl)hexadecanethiol and hexadecanethiol were compared in a monomeric ether solvent (dimethoxyethane) and two **oligomeric** polyether solvents of mol. mass 400 and 1000. The rate measurements of the ferrocene-ferrocenium electron transfer, which

presumably occurs by electron tunneling through the alkane chain linker, were made using cyclic voltammetry at Au **electrodes**, as a function of potential sweep rate and temp. The electron-transfer rate consts. are larger in dimethoxyethane (DME) than in the two polyethers, and slowest in the longer chain polyether, whereas the activation barriers for electron transfer are approx. the same in the three solvents. The difference in rate const. between DME and the poly(ethylene) oxide of mol. mass 400 solvents at 298 K was 14-fold, within a factor of two of the 27-fold difference predicted from the solvent dynamics model and given the longitudinal relaxation times,  $\tau_L$ , of the two solvents. Solvent dynamics probably is at least in part the origin of the kinetic difference between the monomeric and polymeric solvents. The behavior of voltammetric peak broadening and apparent rate const. variation with potential sweep rate is indicative of a kinetic dispersion in the ferrocene electron-transfer kinetics; this dispersity increases in the polymer solvents and at lowered temp. The ferrocene kinetics are faster in DMA solvent than in aq. HClO<sub>4</sub> which is rationalized based on differences in dielec. properties and a consequent lower outer sphere reorganizational barrier in DME.

L3 ANSWER 32 OF 43 CAPLUS COPYRIGHT 2002 ACS

AN 1996:554432 CAPLUS

DN 125:179773

TI Spectroelectrochemistry of Methyl Viologen/Iodide Solutions at Mercury Film **Electrodes**

AU Lezna, R. O.; Centeno, S. A.

CS Facultad de Ciencias Exactas, Universidad Nacional de La Plata, La Plata, 1900, Argent.

SO Langmuir (1996), 12(20), 4905-4908

CODEN: LANGD5; ISSN: 0743-7463

DT Journal

LA English

AB Me viologen (MV<sup>2+</sup>) was studied at a thin mercury film **electrode** in the presence of iodide ions. Conventional electrochem. and in-situ optical probes were applied to study processes not previously obsd. in fluoride solns. As the potential is made neg., iodide desorption is seen attended by an intense increase in reflectivity. The MV<sup>2+</sup> 1st redn. coincides with the formation of the (MV.bul.+I<sup>-</sup>) species on the surface, at the **monolayer** level, showing strong adsorbate-adsorbate interactions and a flat orientation of the pyridyl groups. The a.c. current response accompanying the appearance of the (MV.bul.+I<sup>-</sup>) film is similar to that of a phase transition (condensation) in the adsorbed state. The dissocn. of (MV.bul.+I<sup>-</sup>) clusters, to yield MV<sup>0</sup>(solid) + I<sup>-</sup>(aq), at the onset of the 2nd redn. wave of MV<sup>2+</sup>, leads to a reflectivity enhancement in the in-phase optical signal paralleled by a sharp doublet in the imaginary current response. The splitting of the redn. peak of (MV.bul.+I<sup>-</sup>) may arise from different orientations of similar clusters or from distinct **oligomer** sizes.

L3 ANSWER 33 OF 43 CAPLUS COPYRIGHT 2002 ACS

AN 1995:920207 CAPLUS

TI Polymerization of pyrrole on micropatterned self-assembled **monolayers**.

AU Collard, David M.; Sayre, Curtis N.; Henderson, Paul T.

CS Georgia Institute Technology, School Chemistry and Biochemistry, Atlanta, GA, 30332-0400, USA

SO Book of Abstracts, 210th ACS National Meeting, Chicago, IL, August 20-24 (1995), Issue Pt. 1, COLL-168 Publisher: American Chemical Society, Washington, D. C.

CODEN: 61XGAC

DT Conference; Meeting Abstract

LA English

AB **Electrodes** modified with self-assembled **monolayers** (SAMs) of pyrrole-substituted alkanethiols give rise to an irreversible anodic voltammetric wave corresponding to oxidn. of surface immobilized pyrrole. On subsequent cycles a new reversible wave appears at ca. +200 mV, consistent with previous suggestions that electrogenerated cations are subject to coupling to afford surface-confined **monolayers** of conjugated **oligomers**. Use of these monomer-modified **electrodes** as substrates for polymn. of pyrrole affords extremely smooth films of polypyrrole with enhanced cond. SAMs of alkanethiols strongly affect the kinetics of pyrrole electropolymn. and the morphol. of the resulting polymer owing to their effect on the nucleation mechanism. Polypyrrole deposited on **electrodes** modified with n-alkanethiols has an extremely rough morphol. The difference in the rate of polymer deposition on dissimilar alkanethiols allows for the formation of features of polypyrrole with micron-scale definition by polymn. on microcontact printed patterns of SAMs.

L3 ANSWER 34 OF 43 CAPLUS COPYRIGHT 2002 ACS

AN 1995:78855 CAPLUS

DN 122:43580

TI Conductivity and photoconductivity in nanosize conductors

AU Van der Auweraer, M.; Catry, C.; De Schryver, F. C.; Bengs, H.; Karthaus, O.; Haeussling, L.; Ringsdorf, H.

CS Chem. Dep., K.U. Leuven, Louvain, 3001, Belg.

SO Microchem. Proc. JRDC-KUL Jt. Int. Symp. (1994), Meeting Date 1993, 455-68. Editor(s): Masuhara, Hiroshi. Publisher: North-Holland, Amsterdam, Neth.

CODEN: 60NNAC

DT Conference

LA English

AB Spreading of a soln. of monomers and **oligomers** of hexa-alkoxytriphenylenes, which form bulk discotic mesophases, on a Langmuir trough allows to obtain stable **monolayers**. By successive deposition of **monolayers** it is possible to obtain multilayers, with a thickness 2-80 nm which are characterized by a columnar packing of the arom. moieties. When the Langmuir-Blodgett films are deposited on interdigitating **electrodes** with a spacing of 100  $\mu\text{m}$ , it is possible to obtain a dark current which is 1 order of magnitude larger for the **oligomer** compared to the monomer. The dark currents are proportional to the no. of layers and depend in a superlinear way on the applied elec. field. Upon illumination with UV light a photocurrent proportional to the applied field and the square of the incident light intensity can be obsd. The action spectrum of the photocurrent corresponds to the absorption spectrum of the Langmuir-Blodgett films. The photocurrent is enhanced in the presence of O. As obsd. for the dark current the photocurrent is an order of magnitude larger for the **oligomer** compared to the monomer. A similar behavior is obsd. for the emission spectra of the Langmuir-Blodgett films which consist for the monomer of a structured band and resemble those of a dil. soln. For the **oligomer** they consist mainly of a bathochromic structureless band suggesting efficient excimer or dimer formation.

L3 ANSWER 35 OF 43 CAPLUS COPYRIGHT 2002 ACS

AN 1994:640600 CAPLUS

DN 121:240600

TI Simple models for adsorption on **electrodes**. II. Aggregation processes and phase transitions

AU Nikitas, P.; Andoniou, S.

CS Laboratory of Physical Chemistry, Department of Chemistry, Aristotle University of Thessaloniki, Thessaloniki, 54006, Greece

SO J. Electroanal. Chem. (1994), 375(1-2), 339-56

CODEN: JECHES; ISSN: 0368-1874

DT Journal

LA English

AB The aggregation of neutral org. mols. on **electrode** surfaces to form **oligomers** or surface micelles and the phase transformations of an adsorbed **monolayer** were studied by statistical mechanics. The model developed for aggregation phenomena predicts that the formation of **oligomers** is not depicted in the capacitance plots, which exhibit the same features as those for adsorption of monomers under all circumstances. The equil. between monomers and **oligomers** extends throughout the polarization range where these two states of the adsorbate coexist. As the no. of monomer units in the aggregates increases, monomers and aggregates tend to sep., occupying different polarization regions. The equil. between monomers and large aggregates leads in general to complicated capacitance plots characterized by the appearance of very sharp capacitance peaks. The same features characterize the formation of mixed two-dimensional micellar films on **electrode** surfaces. Phase transformations of adsorbed **monolayers** on **electrode** surfaces, which may give either two immiscible concd. surface solns. of adsorbate in solvent and vice versa or pure adsorbate ppt., are examd. within the framework of the mol. models developed in this series of papers. The sepn. of the adsorbed layer to immiscible surface solns. is related to the short-range particle-particle interactions, whereas the surface pptn. process is considered as an aggregation process where the aggregation no. tends to infinity. In general there is an acceptable agreement between theory and expt.

L3 ANSWER 36 OF 43 CAPLUS COPYRIGHT 2002 ACS

AN 1993:251581 CAPLUS

DN 118:251581

TI The light-dependent oxygen reduction by **monolayers** of hydrated chlorophyll a **oligomer**

AU Volkov, A. G.; Gugeshashvili, M. I.; Munger, G.; Leblanc, R. M.

CS Dep. Hortic., 288 Plant and Soil Sci. Build., Mich State Univ., East Lansing, MI, 48824, USA

SO Bioelectrochem. Bioenerg. (1993), 29(3), 305-14

CODEN: BEBEBP; ISSN: 0302-4598

DT Journal

LA English

AB The phenomenon of light-dependent O<sub>2</sub> uptake by **monolayers** of hydrated chlorophyll a **oligomer** deposited by the Langmuir-Blodgett technique on an SnO<sub>2</sub> optically transparent **electrode** has been obsd. Spectra of cathodic photocurrents coincided with the absorption spectrum of hydrated **oligomer** of chlorophyll a. In the presence of an artificial electron donor, hydroquinone, and an oxygen electron acceptor, both the cathodic and the anodic photocurrent caused by dry and wet chlorophyll a mols. of **monolayer** were measured under illumination in the range 400-800 nm. The effects of **electrode** potentials and redox reagents on the magnitude of solar energy conversion by the chlorophyll a **monolayer** at the optically transparent **electrode** are discussed. ESR and CD spectra show that hydrated **oligomer** of chlorophyll a consists of six mols. of chlorophyll a bonded with water mols.

L3 ANSWER 37 OF 43 CAPLUS COPYRIGHT 2002 ACS

AN 1993:156700 CAPLUS

DN 118:156700

TI Effect of carbon monoxide on platinum-catalyzed decomposition of formic acid in ultrahigh vacuum

AU Columbia, M. R.; Crabtree, A. M.; Thiel, P. A.

CS Dep. Chem. Ames Lab., Iowa State Univ., Ames, IA, 50011, USA  
SO J. Electroanal. Chem. (1993), 345(1-2), 93-105  
CODEN: JECHES; ISSN: 0368-1874  
DT Journal  
LA English  
AB Previous work established that Pt(111) catalyzes the decompn. of HCOOH via a formate intermediate, ultimately yielding CO<sub>2</sub> and H<sub>2</sub> as gas-phase products in the environment of ultrahigh vacuum. In this work, the authors describe the effect of CO, which is a known poison in the electrochem. oxidn. of HCOOH at Pt surfaces. They find that CO exerts 2 main effects. First, it prevents conversion of mol. acid to the formate intermediate and promotes desorption of the mol. acid, both as monomers and **oligomers**. Presumably, this is due to blocking of sites necessary to accommodate the dissocn. products. Second, CO promotes a new but minor decompn. pathway by which up to 0.04 **monolayers** of the acid reacts. These results are compared with the electrochem. literature.

L3 ANSWER 38 OF 43 CAPLUS COPYRIGHT 2002 ACS

AN 1992:588400 CAPLUS

DN 117:188400

TI The light-dependent oxygen uptake by **monolayers** of hydrated chlorophyll .alpha. **oligomer**

AU Volkov, A. G.; Gugeshashvili, M. I.; Munger, G.; Leblanc, R. M.

CS Cent. Rech. Photobiophys., Univ. Quebec, Trois-Rivieres, PQ, Can.

SO Biol. Membr. (1992), 9(6), 576-80

CODEN: BIMEE9; ISSN: 0233-4755

DT Journal

LA Russian

AB Hydrated (in water-satd. hexane) chlorophyll a formed **oligomeric** aggregates whose **monolayer** on a transparent SnO<sub>2</sub> **electrode** photocatalyzed dissolved O<sub>2</sub> redn. by electrons from the **electrode** with a max. quantum yield of 0.45% at pH 6.9 and -50 mV **electrode** potential. The photocurrent was stable during 5 h, and the absorbance spectra of the chlorophyll a **oligomers** were not altered. Applying 3-5 layers of chlorophyll a decreased the effectiveness of photocatalysis and the quantum yield. Addn. of reduced hydroquinone (QH<sub>2</sub>) demonstrated that a portion of chlorophyll a was not clustered, but comprised of single mols. characteristic of chlorophyll a dissolved in dry hexane. At **electrode** potentials ranging from -50 to -150 V, the monomol. chlorophyll a transferred electrons from QH<sub>2</sub> to the SnO<sub>2</sub> **electrode**, while the hydrated **oligomer** concomitantly transferred electrons from the **electrode** to O<sub>2</sub> dissolved in the electrolyte. Purging O<sub>2</sub> by Ar bubbling suppressed the cathodic current caused by O<sub>2</sub> photoredn. The concomitant electron transport in opposite directions is due to a difference in redox potentials between the dry and hydrated chlorophyll and to the capacity of the hydrated chlorophyll a **oligomer** cluster for multielectronic reactions. The results are related to chlorophyll a role in photorespiration and charge sepn.

L3 ANSWER 39 OF 43 CAPLUS COPYRIGHT 2002 ACS

AN 1992:508366 CAPLUS

DN 117:108366

TI Photorespiration of the **monolayers** of hydrated chlorophyll-A **oligomer**

AU Volkov, A. G.; Gugeshashvili, M. I.

CS Cent. Rech. Photobiophys., Univ. Quebec, Trois-Rivieres, PQ, G9A 5H7, Can.

SO Charge Field Eff. Biosyst.--3, [Int. Symp.], 3rd (1992), Meeting Date 1991, 365-72. Editor(s): Allen, Milton J. Publisher: Birkhaeuser, Boston, Mass.

CODEN: 57VVAA

DT Conference

LA English

AB Light energy conversion in wet chlorophyll a **monolayer** at a SnO<sub>2</sub> optically transparent **electrode** was studied. The redn. of O<sub>2</sub> under illumination (photorespiration) was obsd. in this system.

L3 ANSWER 40 OF 43 CAPLUS COPYRIGHT 2002 ACS

AN 1991:181274 CAPLUS

DN 114:181274

TI Preparation of active Langmuir-Blodgett films of glucose oxidase

AU Sun, Songcheng; Ho-Si, Phuoc Hoa; Harrison, D. Jed

CS Dep. Chem., Univ. Alberta, Edmonton, AB, T6G 2G2, Can.

SO Langmuir (1991), 7(4), 727-37

CODEN: LANGD5; ISSN: 0743-7463

DT Journal

LA English

AB Active Langmuir-Blodgett (LB) films of glucose oxidase (GO, *Aspergillus niger*) can be prepd. directly by spreading the enzyme at the air-water interface and transferring to a substrate; no interaction with lipid films is required. Native enzyme LB film activity is poor, however, as detd. by electrolysis of H<sub>2</sub>O<sub>2</sub> produced by reaction with glucose and O<sub>2</sub>. Modified enzyme can be prepd. by reaction with glutaraldehyde before spreading on the subphase, and this results in LB films on Pt substrates that are 5-15-fold more active, depending on reaction conditions. These films exhibit an activity similar to conventional bovine serum albumin immobilized enzyme **electrodes** and a response time of <3 s. Nominally monomol. layers are formed by using GO modified by reaction with glutaraldehyde for 24 h at 5.degree., followed by ultrafiltration to remove **oligomers** before spreading on the subphase. Deposition at a surface pressure of 30 mN/m onto Si gives a film thickness of 48 .ANG./layer, compared to 30 .ANG./layer for the native enzyme. Films of ultrafiltered, modified GO appear smooth at 70,000-fold magnification using SEM. LB films of modified GO that is not ultrafiltered show even greater activity and are apparently thicker; however, SEM shows these films have an island structure so that the mass deposited is greater than for a true **monolayer**. Homogeneous assays of the glutaraldehyde treated enzyme showed .apprx.89% of the activity of the native enzyme, with minimal change in selectivity. Gel electrophoresis of the native enzyme using denaturing conditions gives only the 80,000-dalton subunit, whereas the modified enzyme shows the presence of 11% subunit, 60% holoenzyme, and 29% **oligomers** of the enzyme when 1st reacted 24 h at room temp. in 2.5% glutaraldehyde. The product distribution can be controlled by reaction conditions. The results indicate an increased resistance to denaturing follow inter- and intramol. crosslinking with glutaraldehyde.

L3 ANSWER 41 OF 43 CAPLUS COPYRIGHT 2002 ACS

AN 1984:128649 CAPLUS

DN 100:128649

TI Electron exchange between bis(1,10-phenanthroline)copper(1+) adsorbed on graphite and bis(1,10-phenanthroline)copper(2+) in solution

AU Lee, Chi Woo; Anson, Fred C.

CS Arthur Amos Noyes Lab., California Inst. Technol., Pasadena, CA, 91125, USA

SO Inorg. Chem. (1984), 23(7), 837-44

CODEN: INOCAJ; ISSN: 0020-1669

DT Journal

LA English

AB The bis-1,10-phenanthroline complexes of Cu(I) and Cu(II) are both adsorbed by pyrolytic graphite **electrodes** from aq. chlorides. The adsorption of the Cu(II) complex reaches a full **monolayer** at a concn. of ca. 0.1 mM. The Cu(I) complex appears to **oligomerize** both in soln. and in the adsorbed layer. As a result, much larger quantities of the Cu(I) complex can be deposited on the **electrode**

surface. Rotating-disk voltammetric measurements of the redn. of Cu(phen)<sub>2</sub><sup>2+</sup> at **electrodes** coated with the Cu(I) complex were used to measure the rate of electron transfer between the 2 complexes. This rate was independent of the quantity of Cu(I) deposited on the **electrode**, indicating that only the outermost layer of relatively impervious deposit participated in the electron exchange. An est. of .apprx.105 m<sup>-1</sup> s<sup>-1</sup> was obtained for the rate const. governing the self-exchange reaction.

L3 ANSWER 42 OF 43 CAPLUS COPYRIGHT 2002 ACS

AN 1980:612323 CAPLUS

DN 93:212323

TI Photoelectrochemistry of tris(bipyridyl)ruthenium(II) covalently attached to n-type tin(IV) oxide

AU Ghosh, Pushpito; Spiro, Thomas G.

CS Dep. Chem., Princeton Univ., Princeton, NJ, 08544, USA

SO J. Am. Chem. Soc. (1980), 102(17), 5543-9

CODEN: JACSAT; ISSN: 0002-7863

DT Journal

LA English

AB Ru(bpy)<sub>3</sub><sup>2+</sup> (bpy = 2,2'-bipyridyl) was covalently attached to n-type SnO<sub>2</sub> via condensation of surface hydroxyl groups with (4-(trichlorosilylethyl)-4'-methyl-2,2'-bipyridine)bis(2,2'-bipyridine)ruthenium bis(hexafluorophosphate). A thick coating (.apprx.1000 layers, based on the surface hydroxyl group concn.) was produced, presumably via **oligomerization** of hydrolyzed -SiCl<sub>3</sub> groups. The coating, which was stable to org. solvents as well as to aq. acids and bases, gave reversible cyclic voltammograms, with peak potentials shifted slightly from those of aq. Ru(bpy)<sub>3</sub><sup>2+</sup>, but the no. of electroactive mols. corresponded only to a **monolayer**. The coated **electrode** gave a photocurrent about twice that obsd. for SnO<sub>2</sub> in contact with aq. 4 mM Ru(bpy)<sub>3</sub><sup>2+</sup>, with a slightly red-shifted excitation spectrum. Only a small fraction of the electroactive mols. appeared to participate in excited-state electron transfer, although a steady-state current was supported, presumably by slow electron transfer from the outer layers. The photocurrent increases with applied potential, then reaches a plateau, and falls off again near the redn. potential of Ru(bpy)<sub>3</sub><sup>2+</sup>; the falloff is attributed to back-electron transfer via tunnelling through the thin space charge layer.

L3 ANSWER 43 OF 43 CAPLUS COPYRIGHT 2002 ACS

AN 1979:45934 CAPLUS

DN 90:45934

TI Preparation of chemically derivatized platinum and gold **electrode** surfaces. Synthesis, characterization, and surface attachment of trichlorosilylferrocene, (1,1'-ferrocenediyl)dichlorosilane, and 1,1'-bis(triethoxysilyl)ferrocene

AU Wrighton, Mark S.; Palazzotto, Michael C.; Bocarsly, Andrew B.; Bolts, Jeffrey M.; Fischer, Alan B.; Nadjro, Louis

CS Dep. Chem., Massachusetts Inst. Technol., Cambridge, Mass., USA

SO J. Am. Chem. Soc. (1978), 100(23), 7264-71

CODEN: JACSAT; ISSN: 0002-7863

DT Journal

LA English

AB The synthesis and characterization of 3 ferrocene-centered, hydrolytically unstable, surface derivatizing reagents and their attachment to pretreated (anodized) Pt and Au **electrode** surfaces are described. Trichlorosilylferrocene (I) [66035-04-9] was isolated from the reaction of SiCl<sub>4</sub> and lithioferrocene; (1,1'-ferrocenediyl)dichlorosilane (II) [66083-73-6] was isolated from the reaction of SiCl<sub>4</sub> and 1,1'-dilithioferrocene; and 1,1'-bis(triethoxysilyl)ferrocene (III) [39732-50-8] was isolated from reaction of ClSi(OEt)<sub>3</sub> with



1,1'-dilithioferrocene. The species I, II, and III were fully characterized by <sup>1</sup>H NMR, mass, and UV-visible spectra and elemental analyses. All are moisture sensitive and are capable of derivatizing anodized Pt surfaces. Such derivatized **electrodes** exhibit persistent cyclic voltammetric waves at a potential expected for an electroactive ferrocene deriv. Greater than **monolayer** coverages are found in each case, as detd. by the integration of the cyclic waves. The cyclic voltammetric parameters are as expected for a reversible, 1-electron, surface-attached electroactive system, except that the peak widths are broader than theor. This result is attributed to chem. distinct ferrocene centers resulting from the **oligomerization** of the derivatizing reagent during the derivatization procedure.

d bib,kwic 1-7 12

L2 ANSWER 1 OF 7 CAPLUS COPYRIGHT 2002 ACS

AN 2000:291304 CAPLUS

DN 132:305456

TI **Electrode** based biosensors in conjunction with nucleic acid probes, colloid particles and electron transfer moieties

IN Bamdad, Cynthia; Mucic, Robert

PA Clinical Micro Sensors, Inc., USA

SO PCT Int. Appl., 99 pp.

CODEN: PIXXD2

DT **Patent**

LA English

FAN.CNT 1

|    | PATENT NO.  | KIND | DATE     | APPLICATION NO. | DATE     |
|----|---|------|----------|-----------------|----------|
| PI | WO 2000024941   | A1   | 20000504 | WO 1999-US25464 | 19991027 |
|    | W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM |      |          |                 |          |
|    | RW: GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG  |      |          |                 |          |

PRAI US 1998-105875 P 19981027

RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD

ALL CITATIONS AVAILABLE IN THE RE FORMAT

TI **Electrode** based biosensors in conjunction with nucleic acid probes, colloid particles and electron transfer moieties

DT **Patent**

AB The invention concerns an **electrode**-type biosensor in conjunction with particles that comprise a self-assembled **monolayer**, a capture probe, an amplification sequence, a label probe hybridized to the amplification sequence; the label probe comprises at least one covalently attached electron transfer moiety (ETM), e.g. a metallocene. Upon binding of a target analyte, a particle and a reporter compn. are assocd. and transported to an **electrode** surface. The ETMs are then detected, allowing the presence or absence of the target analyte to be detd.

ST biosensor **electrode** nucleic acid hybridization particle electron transfer metallocene

IT **Oligomers**

RL: ARG (Analytical reagent use); DEV (Device component use); ANST (Analytical study); USES (Uses)

(conductive; **electrode** based biosensors in conjunction with nucleic acid probes, colloid particles and electron transfer moieties)

IT Biosensors

Conducting polymers

**Electrodes**

Electron transfer

Nucleic acid amplification (method)

Nucleic acid hybridization

Self-assembled **monolayers**

(**electrode** based biosensors in conjunction with nucleic acid probes, colloid particles and electron transfer moieties)

IT Nucleic acids

RL: ANT (Analyte); ANST (Analytical study)

(**electrode** based biosensors in conjunction with nucleic acid probes, colloid particles and electron transfer moieties)

IT Metallocenes

Probes (nucleic acid)

RL: ARG (Analytical reagent use); DEV (Device component use); ANST (Analytical study); USES (Uses)

(**electrode** based biosensors in conjunction with nucleic acid probes, colloid particles and electron transfer moieties)

IT Colloids

(gold; **electrode** based biosensors in conjunction with nucleic acid probes, colloid particles and electron transfer moieties)

IT **Oligomers**

RL: ARG (Analytical reagent use); DEV (Device component use); ANST (Analytical study); USES (Uses)

(insulators; **electrode** based biosensors in conjunction with nucleic acid probes, colloid particles and electron transfer moieties)

IT 7440-57-5, Gold, uses

RL: DEV (Device component use); USES (Uses)

(colloid; **electrode** based biosensors in conjunction with nucleic acid probes, colloid particles and electron transfer moieties)

IT 102-54-5, Ferrocene

RL: ARG (Analytical reagent use); DEV (Device component use); ANST (Analytical study); USES (Uses)

(**electrode** based biosensors in conjunction with nucleic acid probes, colloid particles and electron transfer moieties)

L2 ANSWER 2 OF 7 CAPLUS COPYRIGHT 2002 ACS

AN 1999:723217 CAPLUS

DN 131:347448

TI Electronic detection of nucleic acids using metallocene-modified capture probes on self-assembled **monolayers**

IN Bamdad, Cynthia; Yu, Changyun

PA Clinical Micro Sensors, USA

SO PCT Int. Appl., 164 pp.

CODEN: PIXXD2

DT **Patent**

LA English

FAN.CNT 3

|      | PATENT NO.     | KIND   | DATE     | APPLICATION NO. | DATE     |
|------|----------------|--|----------|-----------------|----------|
| PI   | WO 9957319     | A1   | 19991111 | WO 1999-US1703  | 19990127 |
|      | W:             | AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM |          |                 |          |
|      | RW:            | GH, GM, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG   |          |                 |          |
|      | AU 9924735     | A1   | 19991123 | AU 1999-24735   | 19990127 |
|      | EP 1075541     | A1   | 20010214 | EP 1999-904314  | 19990127 |
|      | R:             | AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI   |          |                 |          |
| PRAI | US 1998-84425  | P  | 19980506 |                 |          |
|      | US 1998-84509  | P  | 19980506 |                 |          |
|      | US 1998-135183 | A  | 19980817 |                 |          |
|      | WO 1999-US1703 | W  | 19990127 |                 |          |

RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD

ALL CITATIONS AVAILABLE IN THE RE FORMAT

TI Electronic detection of nucleic acids using metallocene-modified capture probes on self-assembled **monolayers**

DT **Patent**

AB The present invention is directed to the electronic detection of nucleic acids using self-assembled **monolayers**. **Electrodes** are

provided comprising a **monolayer** comprising conductive **oligomers** and a capture probe; the compns. further comprise a label probe comprising a first portion that is capable of hybridizing to a component of an assay complex, and a second portion comprising a recruitment linker that does not hybridize to a component of an assay complex and comprises at least one covalently attached electron transfer moiety such as a metallocene or more specifically ferrocene. The target sequence is attached to the **electrode** by direct or indirect hybridization to the capture probe and detecting electron transfer between said electron transfer moiety and the **electrode**. Amplifier probes and/or capture extender probes may also be used. Syntheses of deoxyribonucleotide triphosphates with covalently labeled electron transfer moieties such as ferrocene are also described.

- ST nucleic detection **electrode monolayer** probe label;  
metallocene probe **electrode monolayer** nucleic acid  
detection; ferrocene probe **electrode monolayer** nucleic  
acid detection
- IT Bacteria (Eubacteria)  
Virus  
    (detection of; electronic detection of nucleic acids using  
    metallocene-modified capture probes on self-assembled  
    **monolayers**)
- IT DNA fingerprinting  
    **Electrodes**  
    Nucleic acid amplification (method)  
    Nucleic acid hybridization  
    Self-assembled **monolayers**  
        (electronic detection of nucleic acids using metallocene-modified  
        capture probes on self-assembled **monolayers**)
- IT Metalloenes  
    RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)  
        (electronic detection of nucleic acids using metallocene-modified  
        capture probes on self-assembled **monolayers**)
- IT Probes (nucleic acid)  
    RL: ARG (Analytical reagent use); SPN (Synthetic preparation); ANST  
    (Analytical study); PREP (Preparation); USES (Uses)  
        (electronic detection of nucleic acids using metallocene-modified  
        capture probes on self-assembled **monolayers**)
- IT Food analysis  
    (for toxic bacteria; electronic detection of nucleic acids using  
    metallocene-modified capture probes on self-assembled  
    **monolayers**)
- IT Diagnosis  
    (genetic; electronic detection of nucleic acids using  
    metallocene-modified capture probes on self-assembled  
    **monolayers**)
- IT 7732-18-5, Water, analysis  
    RL: AMX (Analytical matrix); ANST (Analytical study)  
        (anal. for toxic bacteria; electronic detection of nucleic acids using  
        metallocene-modified capture probes on self-assembled  
        **monolayers**)
- IT 102-54-5, Ferrocene  
    RL: ARG (Analytical reagent use); RCT (Reactant); ANST (Analytical study);  
    USES (Uses)  
        (electronic detection of nucleic acids using metallocene-modified  
        capture probes on self-assembled **monolayers**)
- IT 250157-94-9P  
    RL: ARG (Analytical reagent use); RCT (Reactant); SPN (Synthetic  
    preparation); ANST (Analytical study); PREP (Preparation); USES (Uses)  
        (electronic detection of nucleic acids using metallocene-modified  
        capture probes on self-assembled **monolayers**)
- IT 1272-08-8P    136292-12-1P    234432-49-6P    234432-52-1P    249928-35-6P

249928-37-8P 250157-75-6P 250157-81-4P 250157-82-5P 250157-83-6P  
250157-87-0P 250157-91-6P

RL: ARG (Analytical reagent use); SPN (Synthetic preparation); ANST  
(Analytical study); PREP (Preparation); USES (Uses)

(electronic detection of nucleic acids using metallocene-modified  
capture probes on self-assembled **monolayers**)

IT 58-61-7, Adenosine, reactions 112-27-6, Tri(ethylene) glycol 540-51-2,  
2-Bromoethanol 6940-78-9, 4-Bromobutyl chloride 18162-48-6,  
tert-Butyldimethylsilyl chloride 34008-82-7 56183-63-2,  
Bis(diisopropylamino)chlorophosphine 58479-61-1, tert-  
Butyldiphenylchlorosilane 89992-70-1 110522-82-2 174221-86-4  
221292-45-1 221623-50-3

RL: RCT (Reactant)

(electronic detection of nucleic acids using metallocene-modified  
capture probes on self-assembled **monolayers**)

IT 12289-45-1P 86864-60-0P 108783-02-4P 129826-45-5P 129826-46-6P  
147526-49-6P 176703-18-7P 187662-48-2P 212061-67-1P 234122-72-6P  
234122-73-7P 234122-74-8P 234122-75-9P 234122-76-0P 234122-77-1P  
234432-44-1P 234432-45-2P 234432-46-3P 234432-48-5P 234432-50-9P  
234432-51-0P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)  
(electronic detection of nucleic acids using metallocene-modified  
capture probes on self-assembled **monolayers**)

IT 249928-33-4P 249928-34-5P

RL: SPN (Synthetic preparation); PREP (Preparation)

(electronic detection of nucleic acids using metallocene-modified  
capture probes on self-assembled **monolayers**)

IT 250215-75-9, 1: PN: WO9957319 SEQID: 53 unclaimed DNA 250226-16-5, 2:  
PN: WO9957319 SEQID: 54 unclaimed DNA

RL: PRP (Properties)

(unclaimed nucleotide sequence; electronic detection of nucleic acids  
using metallocene-modified capture probes on self-assembled  
**monolayers**)

IT 250215-76-0 250215-77-1 250226-01-8 250226-02-9 250226-17-6  
250226-18-7 250226-19-8 250226-20-1 250226-21-2 250226-22-3  
250226-23-4 250226-24-5 250226-25-6 250226-26-7 250226-27-8  
250226-28-9 250226-29-0 250226-30-3 250226-31-4 250226-34-7  
250226-35-8 250226-36-9 250226-37-0 250226-38-1 250226-39-2  
250226-40-5 250226-41-6 250226-42-7 250226-43-8 250226-44-9

RL: PRP (Properties)

(unclaimed sequence; electronic detection of nucleic acids using  
metallocene-modified capture probes on self-assembled  
**monolayers**)

L2 ANSWER 3 OF 7 CAPLUS COPYRIGHT 2002 ACS

AN 1999:723215 CAPLUS

DN 131:348747

TI Electronic methods for the detection of analytes utilizing self-assembled  
**monolayers** having conductive **oligomers** and capture  
binding ligands

IN Bamdad, Cynthia; Yu, Changjun

PA Clinical Micro Sensors, Inc., USA

SO PCT Int. Appl., 143 pp.

CODEN: PIXXD2

DT Patent

LA English

FAN.CNT 3

|    | PATENT NO. | KIND | DATE     | APPLICATION NO. | DATE     |
|----|------------|------|----------|-----------------|----------|
| PI | WO 9957317 | A1   | 19991111 | WO 1999-US10104 | 19990506 |

W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE,  
DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP,

KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN,  
MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM,  
TR, TT, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU,  
TJ, TM

RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK,  
ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG,  
CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

AU 9940725 A1 19991123 AU 1999-40725 19990506

EP 1075549 A1 20010214 EP 1999-924156 19990506

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,  
IE, FI

PRAI US 1998-84509 P 19980506

US 1998-84652 P 19980506

US 1998-135183 A 19980817

WO 1999-US10104 W 19990506

RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD

ALL CITATIONS AVAILABLE IN THE RE FORMAT

TI Electronic methods for the detection of analytes utilizing self-assembled  
**monolayers** having conductive **oligomers** and capture  
binding ligands

DT **Patent**

AB The present invention relates to the use of self-assembled  
**monolayers** with mixts. of conductive **oligomers** and  
insulators to detect target analytes. The following were prepd.:  
adenosine modified with ferrocene at the 2' position, a branched  
adenosine, adenosine with ferrocene attached via a phosphate, ethylene  
glycol-terminated wire, uridine attached to an insulator, and an  
**electrode** contg. capture nucleic acids contg. conductive  
**oligomers** and insulators. **Electrodes** having  
linker-attached capture oligonucleotide probes, conductive  
**oligomers** and insulators were tested.

ST **electrode** self assembled **monolayer** conductive  
**oligomer**; analyte targeting **electrode** self assembled  
**monolayer**; oligonucleotide probe conductive **oligomer**  
insulator **electrode**

IT Carbohydrates, uses

RL: ARG (Analytical reagent use); DEV (Device component use); ANST  
(Analytical study); USES (Uses)  
(as capture binding ligand; electronic detection of analytes using  
self-assembled **monolayers** having conductive **oligomers**  
and capture binding ligands)

IT Electron transfer catalysts  
(attached to recruitment linker; electronic detection of analytes using  
self-assembled **monolayers** having conductive **oligomers**  
and capture binding ligands)

IT **Electrodes**  
(bioelectrodes; electronic detection of analytes using self-assembled  
**monolayers** having conductive **oligomers** and capture  
binding ligands)

IT **Oligomers**  
RL: ARG (Analytical reagent use); DEV (Device component use); PRP  
(Properties); ANST (Analytical study); USES (Uses)  
(conductive; electronic detection of analytes using self-assembled  
**monolayers** having conductive **oligomers** and capture  
binding ligands)

IT Probes (nucleic acid)  
RL: ARG (Analytical reagent use); DEV (Device component use); ANST  
(Analytical study); USES (Uses)  
(conjugates with conductive **oligomer**; electronic detection of  
analytes using self-assembled **monolayers** having conductive  
**oligomers** and capture binding ligands)

IT Ligands

RL: ARG (Analytical reagent use); DEV (Device component use); ANST (Analytical study); USES (Uses)  
 (covalently-attached capture-binding; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT **Electrodes**  
 Electron transfer  
 Nucleic acid hybridization  
 Self-assembled **monolayers**  
 (electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT Nucleic acids  
 RL: ARG (Analytical reagent use); DEV (Device component use); ANST (Analytical study); USES (Uses)  
 (immobilized, as capture binding ligand or recruitment linker; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT Proteins, specific or class  
 RL: ARG (Analytical reagent use); DEV (Device component use); ANST (Analytical study); USES (Uses)  
 (immobilized, as capture binding ligand; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT Electric insulators  
 (**monolayers** contg.; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT Electric conductors  
 (**oligomers**; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT Microscopes  
 (slides, gold-covered, in **electrode** sensor prepn.; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 250227-98-6P  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (as branched nucleoside; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 250226-27-8 250226-28-9  
 RL: ARG (Analytical reagent use); BPR (Biological process); DEV (Device component use); PRP (Properties); ANST (Analytical study); BIOL (Biological study); PROC (Process); USES (Uses)  
 (as capture extender probe; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 250286-34-1D, reaction with metal complexes  
 RL: ARG (Analytical reagent use); BPR (Biological process); PRP (Properties); ANST (Analytical study); BIOL (Biological study); PROC (Process); USES (Uses)  
 (as capture extender probe; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 250286-31-8D, immobilized 250286-33-0D, immobilized 250287-27-5D, immobilized  
 RL: ARG (Analytical reagent use); BPR (Biological process); DEV (Device component use); PRP (Properties); ANST (Analytical study); BIOL (Biological study); PROC (Process); USES (Uses)  
 (as capture probe; electronic detection of analytes using

self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 102-54-5, Ferrocene  
 RL: ARG (Analytical reagent use); DEV (Device component use); RCT (Reactant); ANST (Analytical study); USES (Uses)  
 (as electron transfer moiety attached to recruitment linker; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 234122-75-9P  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (as ethylene glycol terminated wire; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 234432-48-5P 234432-52-1P  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (as ferrocene-modified nucleoside; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 250226-02-9D, reaction with metal complexes 250286-39-6D, reaction with metal complexes 250286-41-0D, reaction with metal complexes 250286-53-4D, reaction with metal complexes 250286-68-1D, reaction with metal complexes 250286-73-8D, reaction with metal complexes 250286-79-4D, reaction with metal complexes 250286-98-7D, reaction with metal complexes 250286-99-8D, reaction with metal complexes  
 RL: ARG (Analytical reagent use); BPR (Biological process); PRP (Properties); ANST (Analytical study); BIOL (Biological study); PROC (Process); USES (Uses)  
 (as label probe; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 250287-23-1 250287-24-2  
 RL: ARU (Analytical role, unclassified); BPR (Biological process); ANST (Analytical study); BIOL (Biological study); PROC (Process)  
 (as neg. control; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 250286-24-9D, reaction with metal complexes 250286-29-4D, reaction with metal complexes 250286-30-7D, reaction with metal complexes  
 RL: ARG (Analytical reagent use); BPR (Biological process); DEV (Device component use); PRP (Properties); ANST (Analytical study); BIOL (Biological study); PROC (Process); USES (Uses)  
 (as neg. probe; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 250226-34-7  
 RL: ARU (Analytical role, unclassified); BPR (Biological process); ANST (Analytical study); BIOL (Biological study); PROC (Process)  
 (as neg. probe; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 234122-77-1P  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (as nucleoside attached to insulator; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 250285-55-3D, reaction with metal complexes 250285-56-4D, reaction with metal complexes 250285-59-7D, reaction with metal complexes 250285-67-7D, reaction with metal complexes  
 RL: ARG (Analytical reagent use); BPR (Biological process); PRP (Properties); ANST (Analytical study); BIOL (Biological study); PROC (Process); USES (Uses)  
 (as pos. probe; electronic detection of analytes using self-assembled



**monolayers** having conductive **oligomers** and capture binding ligands)

IT 250287-04-8 250287-07-1 250287-11-7D, reaction with metal complexes 250287-16-2  
 RL: ANT (Analyte); BPR (Biological process); ANST (Analytical study); BIOL (Biological study); PROC (Process)  
 (as target sequence; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 250287-20-8D, reaction with metal complexes  
 RL: BPR (Biological process); BIOL (Biological study); PROC (Process)  
 (as target sequence; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 295-37-4D, 1,4,8,11-Tetraazacyclotetradecane, complexes with dipyrrophenazine and ruthenium 1272-08-8D, complexes with oligonucleotides 7440-18-8D, Ruthenium, complexes with dipyrrophenazine and cyclam 19535-47-8D, Dipyrro[3,2-a:2',3'-c]phenazine, complexes with ruthenium and cyclam 136292-12-1D, complexes with oligonucleotides 234432-44-1D, complexes with oligonucleotides 234432-52-1D, complexes with oligonucleotides 250157-75-6D, complexes with oligonucleotides 250157-83-6D, complexes with oligonucleotides 250157-87-0D, complexes with oligonucleotides 250228-00-3D, complexes with ruthenium, cyclam, and dipyrrophenazine  
 RL: ARG (Analytical reagent use); BPR (Biological process); DEV (Device component use); PRP (Properties); ANST (Analytical study); BIOL (Biological study); PROC (Process); USES (Uses)  
 (comparison of; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 506-13-8, 16-Hydroxyhexadecanoic acid 507-09-5, Thioacetic acid, reactions  
 RL: RCT (Reactant)  
 (electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 2536-35-8P, 16-Bromohexadecanoic acid 59101-28-9P, 16-Bromohexadecan-1-ol 69839-68-5P, 16-Mercaptohexadecanoic acid  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)  
 (electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 114896-32-1P, 16-Mercaptohexadecan-1-ol  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 540-51-2, 2-Bromoethanol 18162-48-6, tert-Butyldimethylsilyl chloride 40615-36-9, 4,4'-Dimethoxytrityl chloride  
 RL: RCT (Reactant)  
 (in prepn. of branched nucleoside; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 86864-60-0P 212061-67-1P 250227-97-5P  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)  
 (in prepn. of branched nucleoside; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 112-27-6, Tri(ethylene glycol) 540-38-5, 4-Iodophenol 58479-61-1, tert-Butyldiphenylchlorosilane 221292-45-1  
 RL: RCT (Reactant)  
 (in prepn. of ethylene glycol terminated wire; electronic detection of

analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 147526-49-6P 176703-18-7P 187662-48-2P 234122-74-8P  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)  
 (in prepn. of ethylene glycol terminated wire; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 58-61-7, Adenosine, reactions 127-08-2, Potassium acetate 701-99-5, Phenoxyacetyl chloride 6940-78-9, 4-Bromobutyl chloride 56183-63-2, Bis(diisopropylamino)chlorophosphine 89992-70-1 110522-74-2  
 RL: RCT (Reactant)  
 (in prepn. of ferrocene-modified nucleoside; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 12289-45-1P 129826-45-5P 129826-46-6P 234432-44-1P 234432-45-2P 234432-46-3P 234432-50-9P 234432-51-0P  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)  
 (in prepn. of ferrocene-modified nucleoside; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 174221-86-4 221623-50-3  
 RL: RCT (Reactant)  
 (in prepn. of nucleoside attached to insulator; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 234122-76-0P  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)  
 (in prepn. of nucleoside attached to insulator; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 7440-57-5, Gold, reactions  
 RL: DEV (Device component use); RCT (Reactant); USES (Uses)  
 (microscope slide covered with, in **electrode** sensor prepn.; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

IT 250285-93-9D, reaction with metal complexes, immobilized 250286-13-6D, reaction with metal complexes, immobilized  
 RL: ARG (Analytical reagent use); BPR (Biological process); DEV (Device component use); PRP (Properties); ANST (Analytical study); BIOL (Biological study); PROC (Process); USES (Uses)  
 (on gold surface; electronic detection of analytes using self-assembled **monolayers** having conductive **oligomers** and capture binding ligands)

L2 ANSWER 4 OF 7 CAPLUS COPYRIGHT 2002 ACS

AN 1999:8197 CAPLUS

DN 130:49510

TI Electronic methods for the detection of analytes

IN O'Connor, Stephen D.; Kayyem, Jon F.; Meade, Thomas J.

PA Clinical Micro Sensors, Inc., USA

SO PCT Int. Appl., 66 pp.

CODEN: PIXXD2

DT **Patent**

LA English

FAN.CNT 1

|    | PATENT NO. | KIND  | DATE     | APPLICATION NO. | DATE     |
|----|------------|---|----------|-----------------|----------|
| PI | WO 9857159 | AI  | 19981217 | WO 1998-US12430 | 19980612 |
|    | W:         | AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, |          |                 |          |

NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT,  
UA, UG, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM  
RW: GH, GM, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES,  
FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI,  
CM, GA, GN, ML, MR, NE, SN, TD, TG

AU 9879678 A1 19981230 AU 1998-79678 19980612  
EP 988534 A1 20000329 EP 1998-930238 19980612

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,  
IE, FI

JP 2001514762 T2 20010911 JP 1999-503325 19980612  
US 2002009810 A1 20020124 US 1998-96593 19980612

PRAI US 1997-49489 P 19970612  
WO 1998-US12430 W 19980612

RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

DT **Patent**

AB The present invention is directed to the detection of target analytes,  
such as biomols., using electronic techniques, particularly AC techniques.  
The invention also provides the app. for the detection of analyte in a  
test sample, comprising self-assembled **monolayers** and at least  
one metal ion ligand or chelate covalently attached to the  
**electrode** via a conductive **oligomer**.

ST **electrode** biosensor AC technique

IT **Oligomers**

RL: DEV (Device component use); USES (Uses)

(conductive; electronic methods for the detection of analytes)

IT Biochemical molecules

Biosensors

Electric current

**Electrodes**

(electronic methods for the detection of analytes)

L2 ANSWER 5 OF 7 CAPLUS COPYRIGHT 2002 ACS

AN 1998:324918 CAPLUS

DN 129:25365

TI **Electrodes** linked via conductive **oligomers** to nucleic  
acids for detection of nucleic acids

IN Kayyem, Jon F.; O'Connor, Stephen D.; Gozin, Michael; Yu, Changjun

PA Clinical Micro Sensors, USA; Kayyem, Jon F.; O'Connor, Stephen D.; Gozin,  
Michael; Yu, Changjun

SO PCT Int. Appl., 141 pp.

CODEN: PIXXD2

DT **Patent**

LA English

FAN.CNT 1

|    | PATENT NO. | KIND   | DATE     | APPLICATION NO. | DATE     |
|----|------------|--|----------|-----------------|----------|
| PI | WO 9820162 | A2   | 19980514 | WO 1997-US20014 | 19971105 |
|    | WO 9820162 | A3   | 19981112 |                 |          |
|    | W:         | AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM |          |                 |          |
|    | RW:        | GH, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG   |          |                 |          |
|    | US 6096273 | A  | 20000801 | US 1996-743798  | 19961105 |
|    | US 6221583 | B1   | 20010424 | US 1997-899510  | 19970724 |
|    | US 6090933 | A  | 20000718 | US 1997-911085  | 19970814 |
|    | US 6232062 | B1   | 20010515 | US 1997-911589  | 19970814 |
|    | AU 9851967 | A1   | 19980529 | AU 1998-51967   | 19971105 |

|           |    |          |                         |
|-----------|----|----------|-------------------------|
| AU 739375 | B2 | 20011011 |                         |
| EP 939762 | A2 | 19990908 | EP 1997-946876 19971105 |

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI

|               |    |          |                         |
|---------------|----|----------|-------------------------|
| JP 2001507930 | T2 | 20010619 | JP 1998-521668 19971105 |
|---------------|----|----------|-------------------------|

PRAI US 1996-743798 A 19961105  
US 1997-40155 P 19970307  
US 1997-873597 A 19970612  
US 1997-873978 A 19970612  
US 1997-899510 A 19970724  
US 1997-911085 A 19970814  
US 1997-911589 A 19970814  
WO 1997-US20014 W 19971105

TI **Electrodes** linked via conductive **oligomers** to nucleic acids for detection of nucleic acids

DT **Patent**

AB Nucleic acids are covalently coupled to **electrodes** via conductive **oligomers**. Site-selective modification of nucleic acids with electron transfer moieties and **electrodes** gives a new class of biomaterials which can be used as **electrodes** to detect a target sequence in a nucleic acid sample. Thus, a uridine-phenylacetylene conductive **oligomer** phosphoramidite I and 5'-O-DMT-5-ferrocenylacetylenyl-2'-deoxy uridine (UBF) phosphoramidite were synthesized and incorporated into a nucleic acid sequence: ACCATGGAC[UBF]CAGCU-conductive polymer (II). Mixed **monolayers** of II and insulator HS-(CH<sub>2</sub>)<sub>16</sub>OH were constructed on gold **electrodes** and analyzed using cyclic voltammetry and square wave voltammetry in the absence and presence of complementary target sequence.

ST conductive **oligomer** nucleic acid linked **electrode**; hybridization assay nucleic acid **electrode**

IT Nucleic acids  
RL: ARG (Analytical reagent use); DEV (Device component use); ANST (Analytical study); USES (Uses)  
(analogs; manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT **Oligomers**  
RL: DEV (Device component use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses)  
(conducting; manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT Nucleic acids  
RL: ARG (Analytical reagent use); DEV (Device component use); IMF (Industrial manufacture); ANST (Analytical study); PREP (Preparation); USES (Uses)  
(conjugates, with conductive **oligomer** attached to **electrode** and with electron transfer moiety; manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT Glass **electrodes**  
(controlled pore, uridine-modified oligophenylacetylenes loaded on; manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT **Electrodes**  
Electron transfer  
Electron transfer catalysts  
Nucleic acid hybridization  
(manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT Nucleic acids  
RL: ANT (Analyte); RCT (Reactant); ANST (Analytical study)  
(manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT Peptide nucleic acids  
 RL: ARG (Analytical reagent use); DEV (Device component use); ANST (Analytical study); USES (Uses)  
 (manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT Metalloenes  
 RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)  
 (manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT Coatings  
 (passivating; manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT Microscopes  
 (slides; manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT 24250-85-9P, 4-Iodo-L-phenylalanine 52164-27-9P 158686-46-5P  
 207724-44-5P 207724-46-7P 207724-47-8P 207724-48-9P 207724-49-0P  
 207724-50-3P 207724-51-4P 207724-62-7P 207724-63-8P 207724-64-9P  
 207724-66-1P 207724-68-3P 207724-69-4P 207724-70-7P 207724-72-9P  
 207724-77-4P 207724-78-5P 207724-84-3P 207724-85-4P 207724-86-5P  
 207724-87-6P 207724-88-7P 207724-89-8P 207724-90-1P  
 RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation)  
 (conductive **oligomer** intermediate; manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT 63-91-2, L-Phenylalanine, reactions 100-43-6 108-30-5, reactions  
 625-95-6, 3-Iodotoluene 1066-54-2, Trimethylsilylacetylene 20924-05-4  
 35371-03-0, 4-Iodothioanisole 39959-59-6, 4-Iodobenzylamine 81246-79-9  
 113019-11-7 134856-58-9, 1-Trimethylsilyl-2-(4-iodophenyl)acetylene  
 153315-14-1 207724-60-5 207724-65-0  
 RL: RCT (Reactant)  
 (conductive **oligomer** starting material; manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT 207724-52-5P  
 RL: DEV (Device component use); IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process); USES (Uses)  
 (conductive **oligomer**, CPG-supported; manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT 207724-79-6P  
 RL: DEV (Device component use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses)  
 (conductive **oligomer**, gold **electrode**-supported; manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT 207724-57-0P 207724-67-2P 207724-71-8P  
 RL: IMF (Industrial manufacture); PREP (Preparation)  
 (conductive **oligomer**; manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT 207724-55-8P  
 RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation)  
 (conductive **oligomer**; manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT 2536-35-8P, 16-Bromohexadecanoic acid 59101-28-9P, 16-Bromohexadecan-1-ol  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)  
 (insulator intermediate; manuf. of nucleic acids coupled to

**electrodes** via conductive **oligomers** for detection of nucleic acids)

IT 506-13-8 507-09-5, Thioacetic acid, reactions  
 RL: RCT (Reactant)  
 (insulator starting material; manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT 69839-68-5P, 16-Mercaptohexadecanoic acid  
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
 (insulator, coating on **electrode**; manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT 157145-25-0 158400-61-4  
 RL: DEV (Device component use); USES (Uses)  
 (insulator, coating on gold **electrode**; manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT 114896-32-1P  
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
 (insulator; manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT 207724-94-5P 207724-95-6P 207724-96-7P 207724-97-8P 207724-99-0P 207725-01-7P  
 RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation)  
 (intermediate for peptide nucleic acid with electron transfer moiety; manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT 207807-11-2  
 RL: ARG (Analytical reagent use); BPR (Biological process); DEV (Device component use); PEP (Physical, engineering or chemical process); ANST (Analytical study); BIOL (Biological study); PROC (Process); USES (Uses)  
 (manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT 207807-10-1P  
 RL: ARG (Analytical reagent use); BPR (Biological process); DEV (Device component use); PEP (Physical, engineering or chemical process); SPN (Synthetic preparation); ANST (Analytical study); BIOL (Biological study); PREP (Preparation); PROC (Process); USES (Uses)  
 (manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT 13408-62-3, Ferricyanide  
 RL: ARU (Analytical role, unclassified); ANST (Analytical study)  
 (manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT 207724-83-2P  
 RL: BYP (Byproduct); PREP (Preparation)  
 (manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT 7440-57-5, Gold, uses  
 RL: DEV (Device component use); USES (Uses)  
 (manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT 207724-74-1P 207724-93-4P  
 RL: IMF (Industrial manufacture); PREP (Preparation)  
 (manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT 89992-70-1P 207724-73-0P 207724-76-3P  
 RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation)  
 (manuf. of nucleic acids coupled to **electrodes** via conductive **oligomers** for detection of nucleic acids)

IT 54-42-2 1271-42-7, Ferrocene monocarboxylic acid 1694-92-4,  
2-Nitrobenzenesulfonyl chloride 2712-78-9 7087-68-5,  
Diisopropylethylamine 76101-30-9 207724-81-0 207724-91-2  
RL: RCT (Reactant)  
(manuf. of nucleic acids coupled to **electrodes** via conductive  
**oligomers** for detection of nucleic acids)

IT 207724-75-2P  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)  
(manuf. of nucleic acids coupled to **electrodes** via conductive  
**oligomers** for detection of nucleic acids)

IT 207724-82-1P  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(manuf. of nucleic acids coupled to **electrodes** via conductive  
**oligomers** for detection of nucleic acids)

IT 207725-03-9P  
RL: IMF (Industrial manufacture); PREP (Preparation)  
(peptide nucleic acid with electron transfer moiety; manuf. of nucleic  
acids coupled to **electrodes** via conductive **oligomers**  
for detection of nucleic acids)

IT 105-67-9 696-07-1, 5-Iodo uracil 1271-47-2 5292-43-3, tert-Butyl  
bromoacetate 172405-21-9  
RL: RCT (Reactant)  
(starting material for peptide nucleic acid with electron transfer  
moiety; manuf. of nucleic acids coupled to **electrodes** via  
conductive **oligomers** for detection of nucleic acids)

IT 1711-02-0, 4-Iodobenzoyl chloride 93183-36-9, Diisopropylammonium  
tetrazolide 174221-86-4  
RL: RCT (Reactant)  
(starting material; manuf. of nucleic acids coupled to  
**electrodes** via conductive **oligomers** for detection of  
nucleic acids)

L2 ANSWER 6 OF 7 CAPLUS COPYRIGHT 2002 ACS

AN 1993:142991 CAPLUS

DN 118:142991

TI Ionic reservoir at **electrode** surface, and linker preparation

IN King, Lionel George; Raguse, Burkhard; Cornell, Bruce Andrew; Pace, Ronald  
John

PA Australian Membrane and Biotechnology Research Institute, Australia

SO PCT Int. Appl., 53 pp.

CODEN: PIXXD2

DT **Patent**

LA English

FAN.CNT 1

|      | PATENT NO.  | KIND | DATE     | APPLICATION NO. | DATE     |
|------|---|------|----------|-----------------|----------|
| PI   | WO 9217788  | A1   | 19921015 | WO 1992-AU132   | 19920327 |
|      | W: AU, CA, JP, US   |      |          |                 |          |
|      | RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LU, MC, NL, SE    |      |          |                 |          |
|      | CA 2106966  | AA   | 19920928 | CA 1992-2106966 | 19920327 |
|      | AU 9214657  | A1   | 19921102 | AU 1992-14657   | 19920327 |
|      | AU 666113   | B2   | 19960201 |                 |          |
|      | JP 06506061   | T2   | 19940707 | JP 1992-507085  | 19920327 |
|      | EP 639269   | A1   | 19950222 | EP 1992-907785  | 19920327 |
|      | R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, MC, NL, SE |      |          |                 |          |
|      | US 5401378  | A    | 19950328 | US 1993-119166  | 19930921 |
| PRAI | AU 1991-5324  |      | 19910327 |                 |          |
|      | AU 1991-9827  |      | 19911203 |                 |          |
|      | WO 1992-AU132   |      | 19920327 |                 |          |

OS MARPAT 118:142991

TI Ionic reservoir at **electrode** surface, and linker preparation

DT **Patent**

AB **Electrode** membrane combinations are disclosed for use in biosensors. The membrane is attached to the **electrode** by a linker mol. such that a hydrophilic space is provided between the membrane and the **electrode**. The linker mol. comprises, within the same mol., a hydrophobic region which constitutes at least a proportion of the amphiphilic mols. making up the membrane or is attached to or is embedded in the membrane, an attachment region attached to the **electrode**, and a hydrophilic region intermediate said hydrophobic and attachment regions. The hydrophilic region spans the space between the membrane and the **electrode**. To produce a potassium-selective **electrode**, valinomycin was incorporated in the bilayer membrane. This was achieved by addn. of valinomycin to glycerol monooleate in decane to form a bilayer membrane on addn. of this soln. onto a 1 mm<sup>2</sup> Au **electrode** that has adsorbed onto its surface a **monolayer** of a linker mol.: 23-[20'-oxo-19'-oxaeicosa-(Z)-9'-ene]-70-phenyl-20,25,28,42,45-penta-oxo-24-aza-19,29,32,35,38,41,46,47,52,55-decaoxa-58,59-dithiahexaconta-(Z)-9-ene (prepn. given). Prepn. of other linkers is described. The reservoir ability of the linker compds. depends on the length of the hydrophilic region of the mol. Prodn. of a biotinylated gramicidin-contg. bilayer membrane biosensor using trifluoroethanol to achieve an improved gating response is also described.

ST **electrode** membrane linker mol; potassium selective **electrode** membrane linker; reservoir **electrode** biosensor linker mol

IT Lipids, uses  
RL: USES (Uses)  
(Archaeobacterial, linker mol. for membrane **electrode** with hydrophilic and hydrophobic and attachment regions of)

IT Ion channel  
Ionophores  
(**electrode** membrane with, linker mols. with hydrophobic and hydrophilic and attachment regions for)

IT Isocyanides  
RL: ANST (Analytical study)  
(functional groups, linker mol. with hydrophilic and hydrophobic and attachment regions of, for prep. bisensor **electrode**)

IT Polyesters, uses  
Polyethers, uses  
Polysaccharides, uses  
Proteins, uses  
Amides, uses  
Esters, uses  
Ethers, uses  
RL: ANST (Analytical study)  
(linker mol. contg. hydrophilic and hydrophobic and attachment regions of, for prep. biosensor **electrode**)

IT Polyamides, uses  
Polyamines  
RL: ANST (Analytical study)  
(linker mol. contg. hydrophobic and attachment and hydrophilic regions of, for prep. biosensor **electrode**)

IT Oligosaccharides  
RL: ANST (Analytical study)  
(linker mol. contg. hydrophobic and hydrophilic and attachment regions of, for prep. biosensor **electrode**)

IT Disulfide group  
Mercapto group  
(linker mol. with hydrophilic and hydrophobic and attachment regions of, for prep. bisensor **electrode**)

IT Membranes  
(synthetic, spanning Archaeobacterial lipid mimics, linker mol. for membrane **electrode** with hydrophilic and hydrophobic and



attachment regions of)

IT Functional groups  
(xanthate, linker mol. with hydrophilic and hydrophobic and attachment regions of, for prepg. bisensor **electrode**)

IT Alkanes, uses  
RL: USES (Uses)  
(C8-16, for second membrane layer, in membrane **electrode** with linker mols. with hydrophobic and hydrophilic and attachment regions)

IT Amphoteric substances  
(amphiphilic, **electrode** membrane with, linker mols. with hydrophilic and hydrophobic and attachment regions for)

IT Bacteria  
(archae-, lipids, linker mol. for membrane **electrode** with hydrophilic and hydrophobic and attachment regions of)

IT **Electrodes**  
(bio-, prepn. of, linker mols. with hydrophobic and hydrophilic and attachment regions)

IT Crown compounds  
RL: ANST (Analytical study)  
(ethers, analogs, **electrode** membrane with, linker mols. with hydrophobic and hydrophilic and attachment regions for)

IT **Electrodes**  
(ion-selective, prepn. of, linker mols. with hydrophobic and hydrophilic and attachment regions)

IT **Electrodes**  
(membrane, prepn. of, linker mols. with hydrophobic and hydrophilic and attachment regions)

IT Amines, uses  
RL: USES (Uses)  
(oligo-, linker mol. contg. hydrophilic and hydrophobic and attachment regions of, for prepg. biosensor **electrode**)

IT Peptides, uses  
RL: ANST (Analytical study)  
(oligo-, linker mol. contg. hydrophobic and attachment and hydrophilic regions of, for prepg. biosensor **electrode**)

IT Functional groups  
(phosphino, linker mol. with hydrophilic and hydrophobic and attachment regions of, for prepg. bisensor **electrode**)

IT Amines, uses  
RL: USES (Uses)  
(poly-, linker mol. contg. hydrophilic and hydrophobic and attachment regions of, for prepg. biosensor **electrode**)

IT Alcohols, uses  
RL: USES (Uses)  
(polyhydric, linker mol. contg. hydrophilic and hydrophobic and attachment regions of, for prepg. biosensor **electrode**)

IT **Electrodes**  
(potassium-selective, prepn. of, linker mol. with hydrophilic and hydrophobic and attachment regions for)

IT Functional groups  
(silyl, linker mol. with hydrophilic and hydrophobic and attachment regions of, for prepg. bisensor **electrode**)

IT Functional groups  
(thioxo, linker mol. with hydrophilic and hydrophobic regions and attachment region of, for prepg. bisensor **electrode**)

IT 2001-95-8, Valinomycin  
RL: ANST (Analytical study)  
(K-selective **electrode** membrane contg., prepn. of, linker mols. with hydrophobic and hydrophilic and attachment regions for)

IT 111-02-4, Squalene 124-18-5, n-Decane 544-76-3, Hexadecane  
RL: ANST (Analytical study)  
(for second membrane layer, in membrane **electrode** with linker

mols. with hydrophobic and hydrophilic and attachment regions)

IT 75-89-8  
 RL: ANST (Analytical study)  
 (in membrane **electrode** prodn. with linker mols. with hydrophilic and hydrophobic and attachment regions, improved gating response in relation to)

IT 7440-09-7, Potassium, properties  
 RL: PRP (Properties)  
 (ion-selective **electrode** for, with linker mol. with hydrophilic and hydrophobic and attachment regions)

IT 146525-59-9  
 RL: ANST (Analytical study)  
 (linker mol. contg. hydrophilic and attachment regions and hydrophobic, for prepg. biosensor **electrode**)

IT 150-60-7, Benzylidysulfide  
 RL: ANST (Analytical study)  
 (linker mol. contg. hydrophilic and hydrophobic and attachment regions of, for prepg. biosensor **electrode**)

IT 56-86-0D, L-Glutamic acid, C12-20 alkyl derivs. 57-88-5, Cholest-5-en-3-ol (3.beta.)-, biological studies 60-24-2, Mercaptoethanol 75-21-8D, Oxirane, **oligomers** 110-15-6D, Succinic acid, reaction products with tetraethylene glycol 112-60-7D, Tetraethylene glycol, reaction products with succinic acid 1323-83-7 1405-97-6, Gramicidin 20255-94-1 25637-84-7, Glycerol dioleate 26657-95-4 27638-00-2 146525-59-9  
 RL: ANST (Analytical study)  
 (linker mol. contg. hydrophilic and hydrophobic and attachment regions, for prepg. biosensor **electrode**)

IT 56-40-6, Glycine, analysis 58-85-5, Biotin 122892-09-5  
 RL: ANST (Analytical study)  
 (linker mol. for membrane **electrode** with hydrophilic and hydrophobic and attachment regions of)

IT 60-32-2  
 RL: ANST (Analytical study)  
 (linker mol. for membrane **electrode** with hydrophobic and hydrophilic and attachment regions of)

IT 58-85-5D, Biotin, reaction products with gramicidin 1405-97-6D, Gramicidin, reaction products with biotin  
 RL: ANST (Analytical study)  
 (membrane **electrode** with, linker mol. for)

IT 1510-21-0P 5662-81-7P 63875-71-8P 90952-27-5P 110934-23-1P 145523-37-1P 145523-38-2P 145523-39-3P 145523-40-6P 145523-41-7P 145523-43-9P 145523-44-0P 145523-46-2P 145523-47-3P 145523-50-8P 145523-53-1P 145523-54-2P 145523-55-3P 145523-56-4P 145523-57-5P 145541-87-3P 145541-88-4P 145541-90-8P 145541-91-9P 146104-09-8P  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)  
 (prepn. and reaction of, in linker mol. prepn. for membrane **electrode**)

IT 145523-42-8P 145523-45-1P 145541-89-5P 145541-93-1P  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (prepn. of, for linker mol. for membrane **electrode**)

IT 145523-48-4P 145541-92-0P 145541-94-2P 145541-95-3P 146104-08-7P  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (prepn. of, in linker mol. prepn. for membrane **electrode**)

IT 62-56-6, Thiourea, reactions 100-53-8, Benzyl thiol 108-30-5, Succinic anhydride, reactions 128-09-6, N-Chlorosuccinimide 143-28-2, Oleyl alcohol 2419-94-5 4530-20-5 89889-52-1 145523-51-9 145523-52-0  
 RL: RCT (Reactant)  
 (reaction of, in linker mol. prepn. for membrane **electrode**)

IT 145523-49-5  
 RL: RCT (Reactant)  
 (redn. of, in linker mol. prepn. for membrane **electrode**)

L2 ANSWER 7 OF 7 CAPLUS COPYRIGHT 2002 ACS

AN 1987:520035 CAPLUS

DN 107:120035

TI Transparent insulation coatings and solutions for formation of the coatings

IN Sasaki, Nobuhiko

PA Alps Electric Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 4 pp.

CODEN: JKXXAF

DT **Patent**

LA Japanese

FAN.CNT 1

|    | PATENT NO.  | KIND | DATE     | APPLICATION NO. | DATE     |
|----|-------------|------|----------|-----------------|----------|
|    | -----       | ---- | -----    | -----           | -----    |
| PI | JP 62090621 | A2   | 19870425 | JP 1985-232171  | 19851017 |

DT **Patent**

AB Mixts. of org. compds. of In, Zr, and Si are fired to give In<sub>2</sub>O<sub>3</sub>-ZrO<sub>2</sub>-SiO<sub>2</sub> system transparent insulation coatings. The org. compds. are dissolved in org. solvents to give solns. for coating formation. **Monolayer** coatings, which prevent diffusion and elution of Na into **electrodes** from glass substrates and shields transparent **electrodes**, are formed by 1 step process. Thus, tris(triethylacetoacetato)indium, Zr(Obu)<sub>4</sub>, Et silicate **oligomer** nitrocellulose, and MEK were mixed to give a soln., in which a glass substrate was dipped. This was fired to give a transparent coating with insulation resistance 2300-2500 M.OMEGA..

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AN 1997:358064 CAPLUS

DN 127:106129

TI Self-assembled monolayers of thiols on gold electrodes for

bioelectrochemistry and biosensors

AU Dong, Shaojun; Li, Jinghong

CS Laboratory of Electroanalytical Chemistry, Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun, Peop. Rep. China

SO Bioelectrochem. Bioenerg. (1997), 42(1), 7-13

CODEN: BEBEBP; ISSN: 0302-4598

PB Elsevier

DT Journal

LA English

AB Monolayers of biol. compds. including redox proteins and enzymes, and phospholipids have been immobilized on a gold electrode surface through self-assembling. These proteins and enzymes, such as cytochrome c, cytochrome c oxidase and horseradish peroxidase (HRP), immobilized covalently to the self-assembled monolayers (SAMs) of 3-mercaptopropionic acid on a gold electrode, communicate directly electrons with the electrode surface without mediators and keep their physiol. activities. The electron transfer of HRP with the gold electrode can also be mediated by the alkanethiol SAMs with electroactive group viologens on the gold electrode surface. All these direct electrochemistries of proteins and enzymes might offer an opportunity to build a third generation of biosensors without mediators for analytes, such as H<sub>2</sub>O<sub>2</sub>, glucose and cholesterol. Monensin and valinomycin have been incorporated into the bilayers on the gold electrode consisting of the SAMs of alkanethiol and a lipid monolayer, which have high selectivity for monovalent ions, and the resulting Na<sup>+</sup> or K<sup>+</sup> sensor has a wide linear range and high stability. These self-assembly systems provide a good mimetic model for studying the physiol. function of a membrane and its assocd. enzyme.

CAPLUS COPYRIGHT 2002 ACS

AN 1994:265159 CAPLUS

DN 120:265159

TI Separation-Free Sandwich Enzyme Immunoassays Using Microporous Gold  
Electrodes and Self-Assembled Monolayer/Immobilized Capture Antibodies

AU Duan, Chuanming; Meyerhoff, Mark E.

CS Department of Chemistry, University of Michigan, Ann Arbor, MI, 48109, USA

SO Anal. Chem. (1994), 66(9), 1369-77

CODEN: ANCHAM; ISSN: 0003-2700

DT Journal

LA English

AB A novel enzyme immunoassay for proteins is performed by designing an electrochem. detection system that enables preferential measurement of surface-bound enzyme-labeled antibody relative to the excess enzyme-labeled reagent in the bulk sample soln. In this initial model system, the assay is carried out using gold-coated microporous nylon membranes (pore size 0.2  $\mu\text{m}$ ) which are mounted between two chambers of a diffusion cell. The membrane serves as both a solid phase for the sandwich assay and the working electrode in the three-electrode amperometric detection system. The capture monoclonal antibody is immobilized covalently on the gold side of the membrane via a self-assembled monolayer of thiocetic acid. In the sepn.-free sandwich assay, both model analyte protein (human chorionic gonadotropin; hCG) and alk. phosphatase-labeled anti-hCG (ALP-Ab) are incubated simultaneously with the immobilized capture anti-hCG antibody. Surface-bound ALP-Ab is spatially resolved from the excess conjugate in the bulk sample soln. by introducing the enzyme substrate (4-aminophenyl phosphate) through the back side of the porous membrane. The substrate diffuses rapidly through the porous membrane where it first encounters bound ALP-Ab at the gold surface. The enzymically generated product, aminophenol, is detected immediately by oxidn. at the gold electrode (at +0.19 V vs Ag/AgCl), and the magnitude of current is directly proportional to the concn. of hCG in the sample. The response time after substrate addn. is <1 min, although max. response toward the analyte protein requires a sample/conjugate preincubation time of 30 min with the porous electrode. The assay is demonstrated to function effectively in both buffer and whole human blood with a detection limit of 2.5 units/L hCG (in blood), which is comparable to most of heterogeneous EIAs that require multiple washing steps.